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1 Introduction

The thesis addresses the issue of the migration role in demographic development of the East Kazakhstan region and its districts during the period of social and economic growth of the Republic of Kazakhstan in 1999–2008.

1.1 Problem definition

In the recent decades, global migration processes have gained a considerable scope. In a number of states touched upon by these processes to a serious degree. According to the official data, in Kazakhstan the annual volume of internal migration counted over 300 thousand people, and the annual volume of external migration counted over 1 million people in 2008. All Kazakhstan regions are recipients of immigration, but the most attractive regions for arriving of immigrants are Almaty, Astana, South-Kazakhstan, Zhambyl, Atyrau, Mangystau and East Kazakhstan regions. Emigration from Kazakhstan was in the direction of Russia, Ukraine, Belarus and Germany. Mostly emigration is exposed in the north, east and central regions of Kazakhstan, having more percent of European ethnic groups (the Russians, the Germans, and the Ukrainians) in population ethnic composition. Most of immigrants are ethnic Kazakhs, i.e. oralmans. South-Kazakhstan, Kyzylorda, Zhambyl Almaty, North-Kazakhstan, Kostanay, Akmola and East Kazakhstan regions are the basis of donors of internal migration, and the recipient cities are Almaty, Astana, and also Atyrau and Mangystau regions (Sailekhanov, 2009:11-14).

Migration changes not only the size of population in the places of departure and arrival of migrants, but also changes the age and sex structure of this population. If we consider migration from the point of view of ethnic composition of migrants, then it changes the ethnic structure of the population. The impact of migration on population sex structure is caused by the fact that migration is a sex selective process, and the migration intensity of males and females differs in particular age groups. It leads to imbalance of sex ratio in particular age groups. Since migration is also an age selective process (people migrate mostly in age group 15-35 years), then migration has altered percentage in labor force by sex.

The main issue of the study is to evaluate the role of migration in population development in the East Kazakhstan region and its subdivisions (urban and rural settlements, districts) in 1999-2008. The choice of the overviewed region was due to the following: a) differentiation of the ethnic structure of migrants in international and internal migration. It means that in international migration (especially in emigration) European ethnic groups have the highest proportion in comparison with other ethnicities. However in internal rural-urban migration the most percentage of migrants consists of the Kazakhs. It leads to changing ethnic composition of the population in urban areas; b) the region is included into the north-eastern ethno-demographic zone, where we observe old age structure of population, intended type of population reproduction, minimal or zero growth of population, and a high level of negative net migration (Aubakirova, 2004); c) in 1999-2008 the increase of the migration intensity from rural areas to urban ones passes along with the decrease of emigration capacity of population in the region.

Relevance of this work consists in the approach where presented special concept of evaluating the role of migration in the development of population size, age and sex structure, this can be used for evaluating the role of migration in population development in other regions of Kazakhstan as well as in the whole state. Also the author uses sophisticated methods of cluster analysis including statistical software SPSS and classifies the districts of the region according to the role of migration in population size, age and sex structure development. The urgency of this topic is conditioned by the fact that this theme in Kazakhstan, and particularly at the regional level, is insufficiently explored. Moreover, the role of migration is most frequently considered in accordance with the impact of migration on the socio-economic development of the country, than with its impact on population development

In addition, it should be noted that the problem of migration in the region and its districts has been researched by the author for several years. The author has started observing the issue since the years of studying a bachelor's program in Kazakhstan. The results of the research were published in Kazakhstan and Russian editions in the Kazakh and Russian languages (Sagynbayeva, 2006, 2007a, 2007b). This master thesis is a sequel to the previous researches, and was supplemented by consideration of the topic at the level of districts of the region and presenting the own concept of evaluating the role of migration in population size, age and sex structure development.

1.2 Study aims, questions and hypothesis

The aim of this study is to evaluate the role of migration in the development of population size, age and sex structure in the region and in its subdivisions: (a) in rural and urban settlements categories; (b) in particular districts of the region during the recent period of social and economic growth of the country (1999-2008). The object of the study is the population in the

East Kazakhstan region and its subdivisions, and the subject is a migration process and its impact on the change of population size and age-sex structure.

The research seeks the answers to the following questions:

a) What was the population development (development of population size, sex and age structure) in the region and its urban and rural settlements, and particular districts during the given period?
b) What was the role of migration in the development of population size, sex and age structure in the region and its urban and rural settlements, and particular districts during the given period?
c) Are there any districts similar by the migration role in the development of population size, age and sex structure?

The work is based on the following hypotheses:

a) Migration in the region and its urban and rural settlements, particular districts has a stronger influence on the changes of population size than natural change of population during the given period.
b) Impact of migration on sex and age structure of population is specific by the type of settlement and (by the type of) district.
c) The districts with similar proportion of urban and rural population, ethnic composition, and economic orientation have similar impact of migration on population size, age and sex structure development.

1.3 Diploma thesis structure

The study consists of twelve parts. In the introduction part the author shows the topicality of the research, defines the object, subject, aim and objectives of the research. Also, the scientific novelty, theoretical and practical significance and the structure of the research are involved. In the second part the meanings of the applied terms and the peculiarities of Kazakhstani migration terminology are explained. The literature review is presented in the third part of the work, where the attention is paid to the following issues: the migration theory and its development, current migration situation in Kazakhstan and the East Kazakhstan region, legislative base of migration in Kazakhstan, and methodology of statistical cluster analysis. The fourth part deals with the theoretical-conceptual work where the main attention is paid to the issues of the theory of the population development (components of the population development and demographic transition models) and principal laws of the migration and mobility transition model. Also there the concept of migration role in the population development is presented. In this concept direct and indirect impact of migration on the population development is described. The fifth part deals with the used data and the problems of data availability, and also the methods of collection and registration of the migration data in the Republic of Kazakhstan. Methodological part of the

work is presented in the sixth part. It should be noted that the methodological part consists of two subparts. They are: the own concept of the evaluation of the migration role in the population size and age structure development and methods and indicators. The seventh part of the research deals with administrative-territorial division of the region and its historical background. Analytical part of the research, including the analysis of the dynamics of the development of size and sex-age structure of the population and evaluation of the role of migration in it is presented in the eighth and ninth parts of the research. The final part of the study presents main findings and conclusions. Lists of tables, figures, schemes, maps, and references and appendices are included.

2 Basic terminology

For any point of the analysis we need to use some definitions which characterize demographic development of the evaluated area. In this paper we used the following terms and notions concerning population development:

Population is a set of "inhabitants" of a given area at a given time.

Population density is the number of inhabitants per unit of land area.

Population development is a change in population size and age and sex structure due to natality, mortality and migration.

Population change is a change in the number of inhabitants of an area. The change may be an increase, a decrease, or zero (Siegel, Swanson, 2004:770).

Components of population change are natality, mortality, and migration. *Natality* is a general term for the incidence of birth within population. *Mortality* is a general term for the incidence of deaths in population or group (op. cit., p.767).

The excess of the natality over the mortality results in natural increase, while the excess of mortality over natality results in natural decrease. The difference between numbers of in-migrations and out-migrations gives net migration, which can be also positive or negative.

The third component of population change is migration. In international terminology of migration the definitions are given by the United Nations:

Migration is defined as a move from one migration defining area to another (or a move to some specified minimum distance) that was made during a given migration interval and that involved a change of residence (United Nations, 1970:1).

A migrant is a person who has changed his usual place of residence from one migration defining area to another (or who moved some specified minimum distance) at least once during the migration interval (op. cit., p. 1).

With respect to a defined territory there are two types of migration: international (external) migration and internal migration:

The term "international migration" refers to change of residence across national boundaries.

An international migrant is someone who moves to or from a different country, where immigrants are people who have arrived in a country from a residence abroad, with the intent to take a residence (Bogue et al., 1993: xxxix).

An emigrant is a migrant who has departed from the country to take up residence abroad (op. cit., p. xxxviii).

Internal migration refers to a change of residence within national boundaries, such as between (federal) states, provinces, cities, or municipalities.

An internal migrant is someone who moves to a different administrative territory within the country (United Nations, 1970:1-4).

Rural-urban migration is the movement of people from the countryside to the city (http://www.scribd.com/doc/15172882/3RuralUrban-Migration-in-LEDCs).

The terms concerning migration in Kazakhstan have some distinguishing features which were provided by the Law of the Republic of Kazakhstan on Population Migration on December 13, 1997, No. 204-1. In this Law some definitions that are not included in the international terminology are used: 'The term "*oralmans*" means foreign citizens or stateless persons of the Kazakh ethnicity, who permanently resided outside Kazakhstan on the date of gaining sovereignty by the Republic of Kazakhstan and arrived in Kazakhstan for the purpose of permanent residence' (The law, 1997).

Other definitions are similar to international definitions of migration which have been set by the United Nations. Population migration is the movement of people (migrants) across the boundaries of a territory (country, region, and district) with changing type of settlements, and persons who move are called immigrants or emigrants. The movement within boundaries of the Republic of Kazakhstan is internal migration, and persons who are migrating are in-migrants and out-migrants. The total migration includes both of these internal and international migrations. In total migration people who move in/out are called also in-migrants and out-migrants. In this paper the analysis of migration was based on the data from total migration of population. These special differences are given owing to distinguishing the data which are used in this study.

These and other refinements of definitions of migrant types are identified by the Law of the Republic of Kazakhstan (December 13, 1997 No. 204-1 on Population Migration). There are two types of migrants: a long-term migrant and a short-term migrant. A long-term migrant is a person who changes his or her usual residence and moves to the territory of the Republic of Kazakhstan for at least 12 months. A short-term migrant is a person who changes his or her usual residence and moves to the territory of the Republic of Kazakhstan for at least 3 months but less than 12 months, except the cases where the movement to the country is for the attitude of recreation, holiday, visits of friends and relatives, business, medical treatment or religious pilgrimage (Agency of Statistics of the Republic of Kazakhstan, 2001). It is considered that we cannot put foreign citizens and stateless persons to the group of immigrants. Students, military personnel, diplomatic officials, international contracted employees, religious workers who

worked in religious associations officially registered in the Republic of Kazakhstan, representatives of foreign mass media, radio and television accredited in the Republic of Kazakhstan, members of the crews of sea and river vessels, air, railway and motorway means of transport are not considered immigrants either (Agency of Statistics of the Republic of Kazakhstan, 2001).

3 Literature overview

The literature used for the research attitudes can be divided into four categories: firstly, migration theory and its development, secondly, migration in Kazakhstan and the East Kazakhstan region, thirdly, the legislative base on migration in the Republic of Kazakhstan, and fourthly, methodological literature regarding cluster analysis.

The first person who was interested in migration theory was Ravenstein. He built the basic rules/laws of migration, and concluded that migration occurs in the investigation of "pull and push" factors. He also divided migratory behavior by sex and age, education, ethnicity, distance, etc. (Ravenstein, 1885) Most of the migration theories is developed under the influence of these laws. Migration is age, sex, and social class selective process. Personal characteristics, such as education, knowledge about potential receiver population, family relations can strengthen or weaken migration as well. These factors can play an important role in formation of "push and pull" factors of migration, especially for internal migration of population (Lee, 1966).

Migration is one of the widely investigated and well presented issues. Factors of migration, causes of migration and its patterns have been researched by many authors. In this study we highlighted Ainsaar who researched migration patterns and causes in case of Estonia. In this paper she defined methods and methodology, causes, economic and social reasons of moving, regional poverty, etc. (Ainsaar, 2004). The spatial and temporal aspects, selection, causes of migration, migration decision-making, and consequences of migration are completed in the work "Human migration" (Lewis, 1982). Relation between natural change and migration of population is described by Zelinsky. His theory of mobility transition discovers understanding of migratory behavior of population in case of development migratory streams in urban and rural migration and natural growth (Zelinsky, 1971). Demographic analysis of migration is explained in the special literature (United Nations, 1970; Siegel, Swanson, 2004; Caselli et al., 2005).

Russian scientists also highlight the theory of migration. They consider three phases of migration processes. The first stage is an initial or preparatory phase to the process of migration. It is a psychological readiness of a person to move to another place. The second stage is migration or movement itself. This period is the stage which forms the statistical value of migration flows. The final stage is a survival rate of migrants in a new location (Rybakovsky, 1987). These stages are important to study because they give a statistical size and structure of migrants and their migratory

behavior. It is very important in evaluation of migration role in population development. Most of Russian scientists think that migrants can change the further natural change of the population by their own reproductive behavior. Most comparative researches of migration in Russian migratory science follow this concept (Yoncev, Khorev, 1996).

Detailed consideration of international migration, taking into account the socio-economic development and related conditions after the move of migrants such as the adaptation process and the products produced are examined by Massey. He also revealed the differences in international migration between developed and developing countries (Massey, 1998). Migration of population is not a process standing alone. There is a strict relationship between migration (emigration), and demographic transition. Modernization of society, industrialization, technological advances have created changes not only in the models of mortality and natality, but also in the model of migration behavior. Mass emigration has an impact on economic development of both places of arrival and departure (Chesnais, 1992).

The second category of the literature is one of the important reference categories. Migration in the post-Soviet space, in particular, Central Asia, including Kazakhstan, and Eastern Europe was described in the report of the World Bank for Europe and Central Asia countries. The report analyzes trends and consequences of international migration for population development in post-Soviet countries and Eastern Europe (Mansoor, Quillin, 2006).

Kazakhstani researches are mostly dedicated to the analysis of international migration in Kazakhstan. Despite the fact that Kazakhstan is a multiethnic country, migration studies are mostly focused on migratory behavior of European ethnics (Russian, German) and Kazakhs (Zhanguttina, 2004; Sadovskaja, 2001; Zabirova, 2001). Since the main ethnic groups in population ethnic structure are Kazakhs and European ethnics, most of the Kazakhs are involved into the internal migration processes, while the most of European ethnics are involved into the international migration. Also a new category of immigrants such as oralmans is a very interesting and important migratory group with its own migratory behavior. Grigorichev is one of the first researchers who made an attempt of cartographic analysis of migration flows in Kazakhstan from the collapse of the Soviet Union till nowadays. He considers Kazakhstan as a transit point for migratory movements in Central Asia. North and East “Russian-speaking” regions are donor migration regions in both internal and international migration from the beginning of the 1990’s till nowadays (Grigorichev, 2004; 2005; 2008).

Alekseenko N.V. and Alekseenko A.N. are the first scientists who analyzed the demographic development of Kazakhstan at the regional level (Alekseenko N.V., 1981, 1995, 1999, 2001; Alekseenko N.V., Alekseenko A.N., 1999; Alekseenko A.N. 1992, 1994, 2002, 2004). They research demographic situation in the East Kazakhstan region and in the country as a whole. The chronological framework of their study is the period from 1887 till nowadays. Their study describes formation of the East Kazakhstan population from the late 19th century till nowadays with all the administrative territorial changes in detail. These studies are very important

for the regional demography because they explain the population issues in connection with ethnic composition of the population, and moreover, they research general demographic changes and population dynamics in the East Kazakhstan region as well as in Kazakhstan. Migration is one of the main factors of the formation of ethnic composition of the population in the East Kazakhstan region. Migration outflow of the Russian-speaking population from the region significantly changed the ethnic character of the population (Tarasova, 2004; Pankovskaya, 2001).

The legislative base of migration in the Republic of Kazakhstan is presented by the Law of the Republic of Kazakhstan on Population Migration (13 December 1997, No. 204-1). Supplements and amendments to the law were added in 2002. The Law regulates social relations in the field of population migration, defines legal, economic and social principles of the migration processes, like for instance those required for the creation of necessary living conditions at a new place for oralmans (The Law, 1997). The general definitions of migration, basic principles of migration regulation and legislation regulating population migration, as well as subjects of migration and its registration on the territory of the country can be found in the Law. Labor migration is one of the major directions of migration policy shown by this Law. Also in this Law a separate chapter is dedicated to the engagement of citizens of the Republic of Kazakhstan in labor activities from abroad. It means that in this Law the size and tenure of workers are noted down. The Law particularly emphasizes the immigration processes, especially the types of immigration and the role and place of oralmans in this immigration process. Special compensations and other kinds of earmarked assistance rendered to repatriates (oralmans or ethnic Kazakhs) were taken into consideration by the Law. As the author assumes, the main aim and direction of the Law is the problem of oralmans or ethnic Kazakhs. From the author's point of view the Law should give more attention to internal migration problems such as categories, rights and responsibilities of migrants, registration problems of migrants, etc.

In this study statistical method of cluster analysis was used. The methodological literature related to cluster analysis is the following: The general information about cluster analysis can be found in different statistics textbooks. More detailed information was taken from some special literature: the introduction to cluster analysis, the main idea, measures, and data specification of cluster analysis was given by Kaufman and Rousseeuw (Kaufman, Rousseeuw, 1990). Also the basic tools of cluster analysis and their measurement were reflected in the work of Holland. In this work the interpretation of dendrogram, considerations of cluster analysis, cluster analysis in R was given in a simpler form (Holland, 2006). In this statistical method of data analysis an important point is distance measure. Finches' paper is focused on the four methods for calculating the distance between individuals using dichotomous data, and the subsequent introduction of these distances to a clustering algorithm such as Ward's one (Finch, 2005). The cluster analysis which is used in statistical applications is significant for missing data and has serious limitations in the number of variables and observations (Johnson, Wichern, 1992; Kulagovskaya, Levchuk, 2008; Chernysh).

4 Conceptual framework

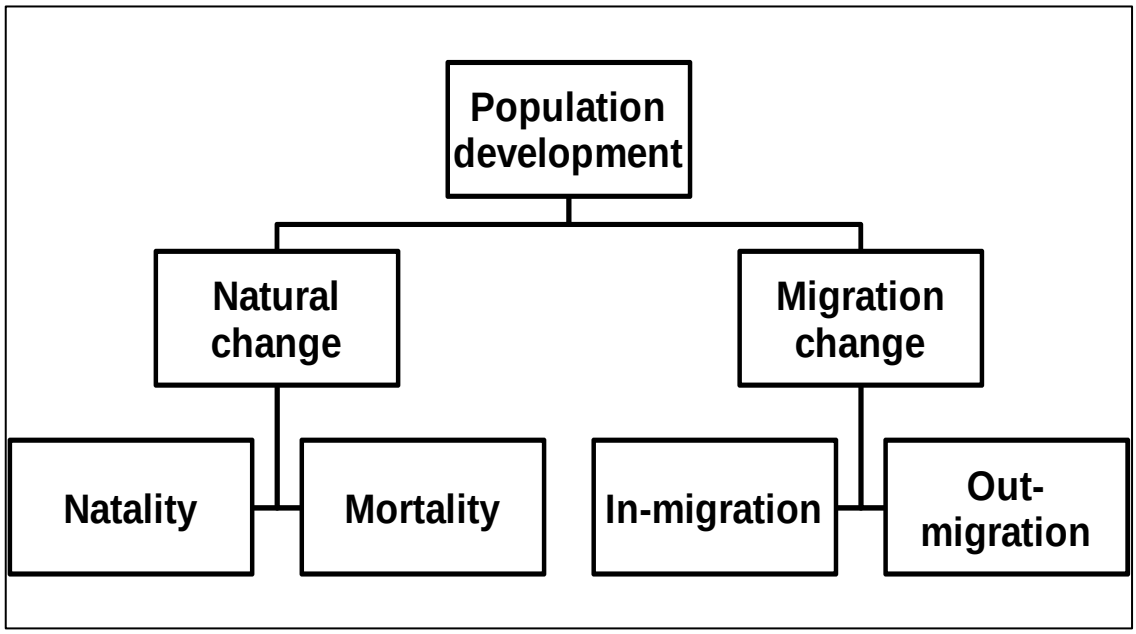
This part is focused on conceptual (theoretical) foundations of the presented study. The conceptual foundations are based on the population development and migration theories. The population development theories including the sub-clauses are related to population development components and demographic transition models. Migration theory includes the theories represented by Ravenstein and Zelinsky.

4.1 Theory of population development

4.1.1 Population development components

Generally speaking, the main components of the population development consist of natural change and migration change. The natural change results from the two so-called natural components of population reproduction (i.e., natality and mortality). The migration change results from in-migration and out-migration. Depending on the size of their components migration change and natural change have positive or negative sign of the indicator, either the difference between the components of migration change and natural change can be positive, negative, or very rarely, zero. That is, if the level of mortality exceeds the level of natality, it results in the negative natural change, and vice versa. If the level of in-migration exceeds the level of out-migration, it results in the positive migration change, and vice versa. Zero sign of natural change and migration change can be in the case when the sizes of their components are equal. The sum of migration change and natural change shows the total change of the population size in the region under study. Here, the age structure of the population under study has also an impact at the levels of mortality, natality, in-migration and out-migration. If the population age structure is old, the level of natality will be low and the level of mortality will be high. Also the level of migration will be low, as people at older ages do not have high migration intensity. Therefore, the levels of natural and migration change will be accordingly low. For the young age structure it is vice versa: the level of natality is high, the level of mortality is low, and the mobility of the population is high. There is no doubt that it will result in the population development (Scheme 1).

Scheme 1: Components of population development



4.1.2 Demographic transition models

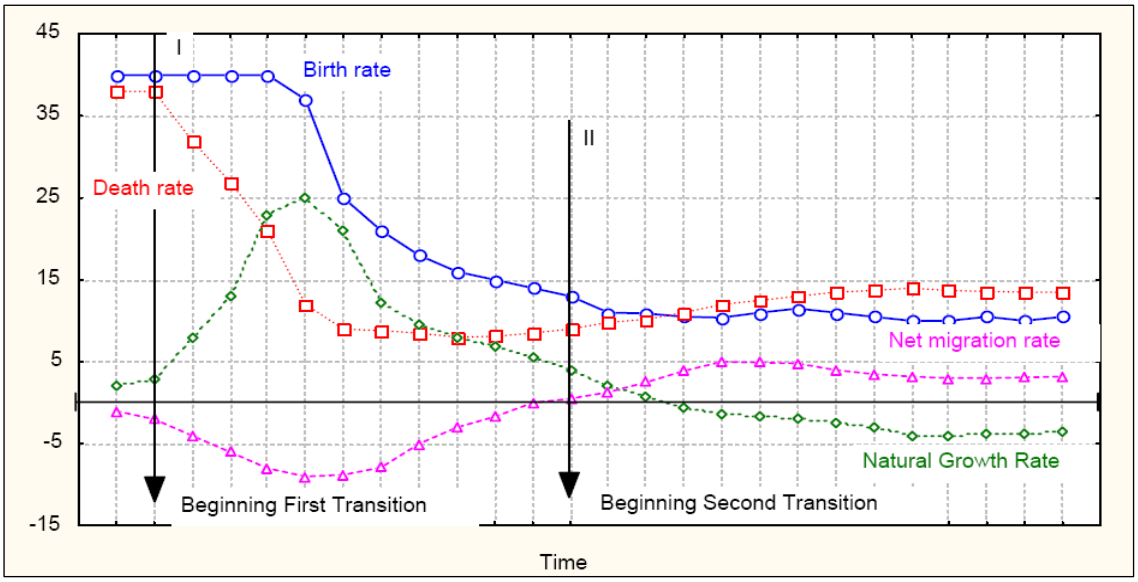
The change of natality, mortality, and migration levels leads to the changes in population size and age and sex structure. The fist person who was interested in these changes was the American demographer Warren Thompson in 1929 (Mostert et. al., 1999:14). These changes of natality and mortality levels were called the "Demographic transition model". The theory of demographic transition is used in demography for describing the evolution of demographic processes (Borisov, 2001:148).

The main idea of the demographic transition model explains as a change of natality and mortality levels from high to low points and their impact on population development over the time. Transformations of mortality and natality levels were descended by modernization processes in the world. The demographic transition bases on four stages: at the first stage both mortality and natality are high, and population growth is low due to the replacement of each other. At the second stage mortality begins to decrease, while the natality is still high. In this period population growth develops in high speed until then natality starts to decline. Most of the developing countries are in the middle or at the end of a transitional stage. Only the sub-Saharan region is at the beginning of this stage. At the third stage mortality continues and natality begins to decline, decreasing population growth. At the final stage, natality and mortality levels are low and no or small population growth can be observed, which is typical for the developed countries (Hilderink, 2000).

Further, the decrease of natality is given by a specular reflection of declining mortality, and otherwise, there would be a danger of overpopulation. Industrialization, modernization of the

society and development of individualism have led to the reduced natality. After the end of transformation of population reproduction (transformation of natality and mortality levels), developed countries have comprehended a further stage of their demographic development. This new stage is a "Second demographic transition". Van de Kaa is one of the first researchers who paid attention to this phenomenon characterized by complete control over natality, which lead to decline of natality below the replacement level. The second demographic transition has some individual characteristics: decrease of marriage rate, increase of divorce rate, cohabitation, abortion, using contraceptive and increase of extra-marital birth, etc. Also life expectancy at birth is longer and ages at first marriage and at first birth are higher. The low level of natality and high life expectancy at birth give a population ageing problem. The imbalance between death and birth is becoming visible. Solving the demographic disequilibrium problem generates such a compensatory trend as migration (van de Kaa, 2002) (Fig. 1).

Fig. 1: Demographic transition models



Source: van de Kaa, 2002

The relevance of these demographic transition models to this research was that this research highlights the role of migration in the population development. The basic models of the population growth are these models of demographic transition. The role of migration is not considered in a classical demographic transition. Jean-Claude Chesnais had himself calculated that in the period of 1846-1932, about 50 million people emigrated to the United States, Canada, Latin America, and Oceania. Net migration in capitalist European countries had been negative in the first demographic transition period, as a consequence of desire of the Old World countries to have hegemony status. The end of expansion of new territories took place after the Second World War (Chesnais, 1982). After the baby boom in the 1960s, Western Europe needed new labor force. This problem was solved by migration of guest migrants from less developed Southern Europe, Arabic world and Turkey to Western European countries. The assumption of

the Governments that the migrants were going to leave the countries after the end of the contract, were wrong. Deaths exceed births, network and family migration starts increasing and population decline processes are observed in the second demographic transition period. The second demographic transition is notable for high intensity of international immigration from developing and less developed countries to developed countries. These factors lead to stagnation of death and birth rates, rise of gross migration, and decrease/increase of natural growth and net migration rates correspondingly. The importance of migration in population growth in the second demographic transition period is forced due to the changes of economical, social and political setup global world. It is a reason to develop the new types of migration such as forced migrants, refugees, political asylums, ecological migrants and others (van de Kaa, 2002) (Fig. 1). These new migrants increase the importance of migration in population development by their flows. The most elementary fact linked to the growth of migration importance, however, is the fact that natural change is relatively very small in the time of the second demographic transition.

In case of Kazakhstan and the East Kazakhstan region, it is quite difficult to say exactly at which stage of demographic transition they have been staying, because the changes of mortality and natality levels happen due to socio-economic and political changes in the state after the collapse of the Soviet Union. These changes certainly started in the Soviet period of the history of Kazakhstan, and the collapse of the Soviet Union was a transition time for people from the former USSR, and demographic behavior of population has also been influenced by these changes because most changes are connected with reproductive attitude of population and migration.

4.2 Ravenstein's laws of migration

From the middle of the 20th century and till nowadays the reasons for migration have changed rapidly. Anyone interested in the research of migration problems in any aspects should take migration laws of Ravenstein into consideration. The Ravenstein's laws of migration are the basic theory of migration. Ernest Ravenstein was a world-renowned migration theorist. He was an English geographer, who used census data from England and Wales to cover his "Laws of Migration". He concluded that "push-pull" factors manage migration, which means that adverse conditions push people to leave places of their residence on behalf of other, more developed places and auspicious conditions pull people to make more developed places their home (an environmental situation, heavy taxation and laws, low level of welfare at places of residence, etc.). People move out from the territory due to "push" conditions, and on the contrary people move in to the territory due to the "pull" conditions. The main motive of migration is a better external economic opportunity. The volume of migration depends on a distance of migration. It means that the volume of migration decreases when the distance increases. Movement of the population is double sided, and it means that for each out-flow of migrants (out-migration) follows in-flow of

migrants (in-migration). Migration occurs on a long-term basis, large towns grow more by migration than by natural change, differentials of migration (e.g., sex, age, educational level, social class, etc) have an impact on an individual's mobility behavior: females are more likely to migrate within the country of their birth than males, males are more likely to migrate farther, most migrants are single and in the 20-35 age bracket (Ravenstein, 1885). Considering the fact that the aim of this research is to describe the role of migration in the population development, then the mostly correlated laws are focused on changing size, age and sex structure of migrants.

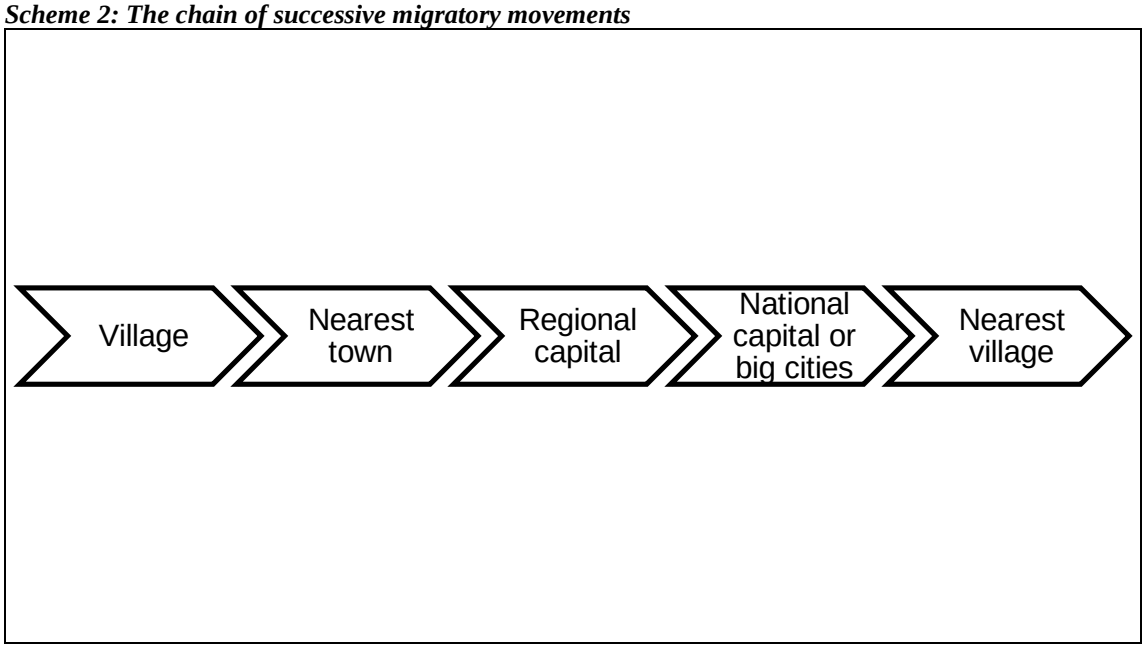
4.3 Zelinsky's theory of mobility transition

The theory of mobility transition is one of the three migration approaches. The theory of mobility transition is discovered by Zelinsky in 1971. Zelinsky's opinion is that the concept of demographic transition should include natality, mortality and migration. The theory of mobility transition is created on the analogy with the theory of demographic transition. The main idea of the theory is the following: 'There are definite, patterned regularities in the growth of personal mobility through space-time during recent history, and these regularities comprise an essential component of the modernization processes' (Zelinsky, 1971). It means that modernization is linked with some specific changes in the prototypes of mobility. One valuable aspect of Zelinsky's approach is that he considered different types of migration: international migration, migration to the frontier areas of the country (frontier ward), rural-urban migration, urban-urban and intra-urban migration, and a whole set of short term types of mobility that he called circulation (Caselli et. al., 2005:299).

Mobility transition model consists of five phases and is developed according to developing societies. They are "premodern traditional society", "early transitional society", "late transitional society", "advanced society", and "future super advanced society". Each of these phases is developed regarding to demographic transition phases. The first phase is topical before urbanization, when migration is small, natural change is zero. During the second phase, the natural growth rate is increasing at a rapid pace, and there is massive migration of population between rural and urban areas and a high level of urbanization. Zelinsky called the third phase critical rung of the mobility transition. We can observe that urban-to-urban migration surpassed rural to urban migration at this phase. Non-economic migration and circulation began to emerge. Non-economic migration means that migration is due to non-economic reasons such as ecological factors, etc. At the fourth phase rural-urban migration goes on but it reduces in relative or absolute rates, and urban-to-urban migration has high prevalence over the rural-to-urban migration. Individual city agglomerations and metropolises are settled at high speed. Natural change is very low or none at all. Almost every residential migration could have the interurban and intraurban feature in the last phase. Stable mortality level decreased a little, and reproductive attitude is not projected in plausible probability (Zelinsky, 1971).

This theory was connected with the research of the basic patterns of changes in directions of migration flows. Internal migration becomes one of the defining factors in formation of cities. The chain of migration steps consist of the following directions: people move from villages to the nearest town, then from this town they move to the regional capital, and from the regional capital they moved to big cities or to the national capital. The main cause of migration is the economic reason. After the self-realization people usually do not want to live in big metropolises and that is why they begin to move back to the nearest villages and this process is called suburbanization. However, it is not a closed cycle, because the movement of population is an unceasing process and this cycle of migration is universal (Scheme 2).

Scheme 2: The chain of successive migratory movements



4.4 The concept of the migration role in population development

Migration has a rather great impact on the demographic structure of the population (that is, on the size and sex-age structure of the population). In the places of departure and arrival, due to the inequality of the scale and intensity, there are direct and indirect impacts of migration on the dynamics and age-sex structure of the population. The direct influence of migration is an immediate change of size and age-sex structure of the population. The indirect influence is related to the role of migration in the population reproduction with the help of the reproductive attitude of migrants.

The population age and sex structure is changed by migration, excluding the initial age and sex structure of population which is constructed earlier by the level of natality and mortality in previous time. Natality influences only on the proportion of. Mainly the size and proportion of newborns are changed owing to mortality, then by migration. The influence of migration and

mortality on particular age groups is different and follows general sex and age patterns of migration and mortality. It means that for some ages migration is a main factor of changing proportion of these age groups in population age structure, and for others mortality is more important. For instance, people migrate more in age group 15-35 years and the level of mortality in this age groups is lower and level of migration – is higher, then in other older age groups, accordingly the impact of migration in formation of this age group is higher than the impact of mortality. Also age by age people begin to migrate less than at younger ages and mortality level increases by every age which leads to decreasing the impact of migration and increasing the impact of mortality in formation of particular age groups.

In this study we are interested in the direct influence of migration in population development, because our statistical data on migration are limited and the indirect influence of migration needs advanced demographic statistics. In this case the indirect influence of migration has additional information on this paper. Usually, reproductive attitude of female migrants or foreign-born women differs from the reproductive attitude of native-born women. So, in Switzerland 23 per cent of all newborns are born in foreigners' families, in Great Britain – more than 15 per cent, in Germany − more than 10% (in the first years after immigration the level of natality of the immigrants is rather higher than among the indigenous population). (Karachurina, 2007:256). 'Migrant women have higher fertility rates than those of the native born population in their destination country but often have lower fertility than women in their origin country. This pattern is often explained by a combination of factors: immigration involves a process of self-selection and may favor those with a propensity to have fewer children; the migration process disrupts childbearing, resulting in lower fertility; and lower fertility is a sign of adaptation to the norms of the new society. This pattern and set of explanations can be found in rural to urban migration within developing countries' (Martin, 2005:9). 'Moreover, higher migrant fertility levels would have more profound and lasting effects on the age structure of the population' (Mussino, Van Raalte, 2008:3).

The reproductive role of migration can be evaluated by cohort fertility analysis of migrant women. This type of fertility analysis is carried out in the Netherlands, France, Australia, and in other countries with advanced demographic statistics. This advanced demographic statistics means that the data on population structure and births are subdivided into the structure of migrant women, born abroad, and their newborns. For example, in the Netherlands this measure is well-compiled because the data of migrants and their newborns in particular calendar year are registered. 'The cohort fertility of women who are currently living in the Netherlands and who are born in a particular year is calculated by dividing the number of children born out of these women by the total number of women born in that year. The result is the cohort fertility of women who are currently living in the Netherlands' (Alders, 2000:3). The registration of population with foreign background is classified in two groups: the first and the second generation. In the first generation people have to be born abroad and at least one of the

parents must be born abroad too. In the second generation persons are born in the Netherlands and have at least one parent belonging to the first generation. Also population with foreign background is classified as non-western and western population by the place of birth (Alders, 2001:2).

Nowadays, the migration of women and elder people, replacement migration are one of the topical issues discussed in the United Nations Organization. The problems of declining number of working age population and population ageing of France and other European countries can only be solved by replacement migration (UN Population Division, 2001). Replacement migration is not a type of migration, because migration types are defined by the causes of migration, for example, ecological migration, educational migration, forced migration, etc. Nowadays, the replacement migration is a tool for solving population decline in the countries with very low or zero population growth or population decline, i.e. the flows of immigrants replace gaps in the natural growth of population in the past and nowadays and irregularities in the sex-age pyramid of the population by mechanical movement.

The process of migration is a socio-economic process, and its intensity could be influenced by any economical or social, even political changes in the country. In other hand, migration can influence on socio-economic development of the country. From this we can say that it is double-edged weapon. The movement from rural areas gives additional problems in human development of these areas such as deficit of labor force, increasing old dependency ratios, etc. However, the migration process to urban areas has an impact on cultural and criminal situation in the cities where migrants arrive in. It means that a big wave of total migrants can be a reason of social and economic tensions between migrants and urban inhabitants. Since the competition on labor market increases and criminality in the city deteriorates. In Kazakhstani editions the emphasis is made on the impact of migration on the social-economic development of the country. However, the impact of migration on the demographic development of the country is one of the most important and first-priority questions.

5 Data availability and sources

Data source and their availability is one of the important questions in any research. In the countries with developing statistics the importance of this question is increasing many times. Especially the data regarding migration usually are not reliable, because the registration of migrants in every country has individual feature, in spite of the generally accepted regulations, provided by the United Nations. This part of the study highlights these questions.

5.1 The data availability

In this study recent vital statistical data were used, which is presented by the Agency of Statistics of the Republic of Kazakhstan. The main source of information was the Demographic Yearbook. It contained the data on administrative and territorial division, changes of the population total number and its age composition by the type of settlements (rural, urban, and total areas), its arrangement on the territory of Kazakhstan, natality and mortality, migration. The Demographic Yearbook was published at the level of the Republic of Kazakhstan (the national level) as well as at the level of each region.

Demographic data in Kazakhstan were not fully available, especially at the regional level. This means that not all of the data were published by the Agency of Statistics of the Republic of Kazakhstan in the demographic yearbooks (Agenstvo statistiki Respubliki Kazakhstan, 2008). For this study the unpublished data were taken by special request from the Agency of Statistics of the Republic of Kazakhstan. The unpublished data included the number of population, death, and migration by completed and abridged age in a given area (Kazakhstan, East Kazakhstan region and its districts). For the availability of the data on migration the situation was the following: the total number of migrants by ethnic groups was given without separation by age and sex for the whole region and its districts.

5.2 Data on migration and its source

The data on migration are divided into three categories: all (total), external (international), and internal. The data on migration in the category "All (total) migration" reflect the whole migration process including internal and external (international). Migrants are considered by sex, age, education level, marital status, and ethnic group (Kazakh, Russian, Uzbeks, Ukrainians, Uigurs, Tatars, Germans, other ethnic groups). The number of emigrants, immigrants and net migrants is divided by the type of settlements (urban and rural areas).

The source of the data on migration is the statistical record cards which include the arrival form (form 19) and departure form (form 20). These cards are in a questionnaire form and are filled in for the whole family. Both cards have the following characteristics of a migrant: date and place of birth, sex, nationality, place of registration, place which a person left and when, from which year a person had been living in the place he or she left, attitude of travel, place of work and occupation in the previous type of settlements , education, family status (married persons should indicate whether or not they arrived with their spouses) and information about children under 16 years old arriving together with adults. The statistical record cards for people arriving/leaving are made out in one copy on their registration or deregistration for permanent residence or for a period of more than six months; and the person filling in the document submits it to a specialist of the registration section of the migration police and local internal affairs departments. Once the persons responsible for the application of the rules of the passport system (migration police) have taken the documents required for the completion of registration or deregistration, they check their authenticity and assume responsibility for the quality of completed papers. These forms are identical for international migration as well as for internal. Statistical record cards relating to arrivals or departures are not completed for:

(1) Persons changing their place of residence within the same town, urban settlement or village, or for larger cities within the boundaries of city districts;

(2) Persons obtaining passports on reaching 16 years old;

(3) Persons changing their passports;

(4) Persons changing their first name, patronymic and surname.

Children under 16 years old changing their place of residence separately from their parents or guardians are registered or deregistered commonly on the basis of a birth certificate. Children under 16 years of age registered or deregistered together with their parents or guardians do not fill in separate statistical record cards. The children's names are entered in the record card made out for the whole family (Agency of Statistics of the Republic of Kazakhstan, 2001) (Appendix 1, Tab. 1, Tab. 2, Tab. 3, and Tab. 4).

There is a problem that not every emigrant as well as immigrant, and in/out migrants, excluding oralmans fills in these cards, and everybody can change their residence several times

in a year, but not every person registers him/herself. That is why migration statistics is not reliable. For example, '10.6 thousand emigrants according to the data of the Agency of Statistics of the Republic of Kazakhstan emigrated from Kazakhstan to Belarus in 2000-2006. During the same period Agency of Statistics of Belarus counted 12.9 thousand of immigrants from Kazakhstan' (Shahotko, 2009). From this we see that not all migrants are registered by statistics. Despite the fact that the Agency of Statistics of the Republic of Kazakhstan is constantly checking and comparing the data, such things takes place very often and most of the post-soviet countries' statistical agencies have the same problems. Therefore, the strengthening measures and control of the migrants' registration should be improved. To do this, in the author's opinion, it is necessary to improve the availability of the information on the issues of registration of the foreign citizens in the migration police and internal migrants in the places of their registration for changing their permanent residence.

6 Methods and indicators for evaluating the role of migration

This chapter is focused on the basic tools for evaluation of population development and impact of migration on demographic development. In this chapter the methods and indicators, which were used in the research, is presented.

6.1 The concept of evaluating the role of migration in population development

As we noted above, population development depends on the change of the size of its components. In this case it is very important to examine the role of each of these components in population change. The concept of evaluating the role of migration in population development in the region is based on a comparative method of demographic indicators. The comparison was made between values of net migration and natural change rates. In this case the sign of these rates has no importance. Even if we have positive net migration and the value of negative natural growth is higher than the first one, then population will decline, which is taking place in the Russian Federation, where, in spite of positive net migration the declining of population is observed. It means that negative or positive balance does not have the same importance as their absolute value. That is why we do not take into account positive or negative signs.

The evaluation of the role of migration in the development of particular age groups was made by comparison between age-specific net migration and death rates. The comparative point was a ratio between these rates, which shows the prevalence of migration or mortality in the formation of particular age groups. If the ratio was higher than one, migration influenced the formation of this age group more than mortality, if it was lower than one, it was quite contrary. If the ratio was one, then migration and mortality influence development of particular age group in equal level. For visibility and more precise analysis we eliminated the sign of net migration rate in calculating the ratio, since, as was noted above, the sign in the ratio is not important for our study.

The evaluation of the role of migration on population development at the level of districts was made in the same way as in the total region and its urban and rural settlements, but was generalized by a classification method. The root of this method was a hierarchical cluster analysis.

The cluster analysis is sorting different objects into groups in a way that the degree of association between two objects is maximal if they belong to the same group and minimal otherwise (http://www.statsoft.com/textbook/cluster-analysis/#h). The hierarchical cluster analysis is made by several statistical applications. In this study the analysis is implemented in the SPSS statistical package.

All variables used in the cluster analysis were independent. The estimating variables for cluster analysis were net migration and natural change rates and the difference between age-specific net migration and age-specific mortality rates by five-year age groups (0, 1-4, 5-9, ... , 80+). The difference showed not only the impact of migration, but also the magnitude of this impact on shaping the size and age and sex structure of the population or in other words how much population was more influenced by migration. If the sign of this difference was negative, it meant that the role of migration was higher than the role of natural change or mortality. From these we had 2 variables for classifying the districts according to the role of migration in population size development and 18 variables for classifying the districts according to the role of migration in development of population age-sex structure.

Since the goal of this cluster analysis is to form similar groups, we have to decide on the criterion to be used for measuring similarity or distance. Distance is a measure of how far apart two objects are, while similarity measures how similar two objects are. For cases that are alike, distance measures are small and similarity measures are large. There are many different definitions of distance and similarity (http://norusis.com/pdf/SPC_v13.pdf). The joining or tree clustering method uses the dissimilarities (similarities) or distances between objects when forming clusters. Similarities are a set of rules that serve as criteria for grouping or separating items. These distances are based on a single dimension or multiple dimensions, with each dimension representing a rule or condition for grouping objects. The most straightforward way of computing distances between objects in a multi-dimensional space is to compute Euclidean distances. However, in our study we use City-block (Manhattan) distance. This distance is simply the average difference across dimensions. In most cases, this distance measure yields results similar to the simple Euclidean distance, but, note that in this measure, the effect of single large differences (outliers) is dampened (since they are not squared). Taking absolute values in City-block distance helps to erase these differences. The city-block distance is the sum of the absolute differences between the values of the item (http://www.statsoft.com/textbook/cluster-analysis/):

$$\text{distance}(x, y) = \sum_i |x_i - y_i|$$

If variables are measured on different scales, variables with large values contribute more to the distance measure than variables with small values and for normalization of the

distribution of these variables we should use standardization. There are many possibilities to choose the measure of standardization. We choose the Z-score standardization, because a standardized z-score represents both the relative position of an individual score in a distribution as compared to the mean and the variation of scores in the distribution (http://acastat.com/Statbook/zscore.htm). Values are standardized to z scores, with a mean of 0 and a standard deviation of 1 (www.people.vcu.edu/~randrews/mgmt643/cluster_analysis.doc). The z-score is like a common yard stick for all types of the data. Each z-score corresponds to a point in a normal distribution and as such is sometimes called a normal deviate since a z-score will describe how much a point deviates from a mean or specification point (http://www.measuringusability.com/z.htm).

Several methods are used in the cluster analysis, the method of Average linkage (between groups) was chosen among them. The advantage of this method is that the distance between clusters is equal to the average value of distances between all possible pairs of observations, and one observation is taken from one cluster, and one from another. The needed information for calculation of the distance is based on all theoretically possible pairs of observations.

The result of this cluster analysis is represented by Horizontal hierarchical tree plot, alternatively called dendrogram. On the horizontal axis there is a linkage distance between clusters and on the vertical axis there is a name and number of cases (labels), in our case the label is a name of districts and its number.

The same operation with cluster analysis can be made also by SAS application, where we should input a data set, then make procedures distance, cluster and tree. The syntax for the SAS application is the following:

PROC DISTANCE DATA=cluster_size1 OUT=cluster_size_a
METHOD=city;
VAR interval (naturalchangerate--netmigrationrate / std=std);
ID district;
RUN;
PROC CLUSTER DATA=cluster_size_a
METHOD=average
OUTTREE=cluster_size_a1;
ID district;
RUN;
PROC TREE DATA=cluster_size_a1 horizontal;
ID district;
RUN;

Where PROC is a procedure which is used, DATA is a data set, VAR is an estimating variables, ID is a single variable to be copied to the OUT= data set and used to generate names

for the distance variables as in the TRANSPOSE procedure, METHOD is the method for computing distance dissimilarity or similarity measures, *std=std* is a standardization. All functions which are used by SPSS application are the same for SAS application.

6.2 Methods and indicators

The basic method of descriptive statistics and demographic analysis is used in the study. The main indicators used belong to stock and flow numbers, crude rates, sex and age specific rates and indexes. The leading research method is a comparative analysis completed by the hierarchical cluster analysis method used for classification of districts by the total and age specific roles of migration in their population development.

Relative increase/decrease (or development index) of population size is calculated by dividing number of population in a given year to the number of population at the beginning of the period (population size in 1999).

The crude natural change rate is a difference between crude birth and death rates. The *crude birth rate (CBR)* indicates the number of live births *N* per 1,000 midyear population *P* in a given year:

$$\mathrm{CBR} = \frac{\mathrm{N}}{\mathrm{P}} * 1000$$

The *crude death rate (CDR)* is the number of deaths *D* per 1,000 midyear population *P* in a given year:

$$\mathrm{CDR} = \frac{\mathrm{D}}{\mathrm{P}} * 1000$$

The *crude natural change rate (CNCR)* is the difference between crude birth rate (CBR) and crude death rate (CDR) (Bogue et al., 1993:xlii):

$$\mathrm{CNCR} = \mathrm{CBR} - \mathrm{CDR}$$

The *age-specific death rate* also can be calculated for specific age groups to see differences in death behavior at different ages or for comparison over time. The death rate $m_{(x)}$ at age x is obtained by relating the deaths $D_{(x)}$ occurring that year among persons of that age to the midyear population $P_{(x)}$ of the same age:

$$m_{(x)} = \frac{D_{(x)}}{P_{(x)}}$$

The net effect of in-migration and out-migration on an area's population (increase or decrease) is referred to as *net migration*. *Crude net migration rate (CNMR)* shows the net effect of in-migration *I* and out-migration *O* on an area's population, expressed as increase or decrease per 1,000 midyear population of the area in the given year:

$$\text{CNMR} = \frac{\text{I - O}}{\text{P}} * 1{,}000$$

In the same way as for mortality, it is possible to calculate at each age-specific net migration (*$nm_{(x)}$)* rates by relating the net number of migrants *($I_{(x)}$- $O_{(x)}$)* observed at each age to the midyear population $P_{(x)}$ of same age (Caselli et.al., 2005: 39):

$$nm_{(x)} = \frac{(\text{I}_{(x)} - \text{O}_{(x)})}{P_{(x)}}$$

Usually evaluation of sex and age structure (composition) of population is illustrated by population age and sex pyramid. 'Single year or five-year age grouping are stacked successively atop each other, beginning with the youngest age. Either number or percent of the total population is used as a horizontal scale. Males are plotted on the left and females are plotted on the right side of the graph. This creates a pyramid-like figure, which usually has unique aspects of the age-sex population structure (Bogue et. al., 1993:xxxvi). People who were born in the same period constitute a cohort people in the same age, and therefore have been exposed to similar historical facts and conditions (Poston, Micken, 2005:20-21).

Also sex structure of population can be evaluated by the indicator called the sex ratio of population. The sex ratio *(SR)* is the index of sex composition in demographic and other scholar analyses. A sex ratio above 100 indicates an excess of males, and a sex ratio below 100 and excess of females (Poston, Micken, 2005:42-43). It is usually defined as the number of males (*Pm)* per 100 females *(Pf)*:

$$SR = \frac{Pm}{Pf} * 100$$

The time intervals for analysis of the population development and the role of migration in this demographic development are the period 1999-2008 for the whole region and its districts, the period 1999-2006 according to the type of settlements (urban, rural areas) of the region. The different chronological limits are different for urban and rural areas because the Law of the Republic of Kazakhstan on administrative-territorial system of the Republic of Kazakhstan was changed on 04.11.2006 № 184-III and urban and rural settlements were officially redefined (The Law, 2006).

7 General characteristics of the region

In this part of the study, we intend to explore a historical view of the region in connection with population development and migration history. The administrative-territorial structure of the region is also presented in this chapter.

7.1 Administrative-territorial division of the region

The East Kazakhstan region is the largest industrial region of the Republic of Kazakhstan. The East Kazakhstan region occupies the territory of 283.3 thousand square kilometers (Agenstvo statistiki Respubliki Kazakhstan, 2008). The region is situated in north-eastern Kazakhstan in the basin of the upper Irtysh River. This region borders on the Altai Krai of the Russian Federation in the north, and the People Republic of China in the south-east, and Pavlodar, Karaganda and Almaty regions of Kazakhstan (Appendix 2, Map 1).

The administrative-territorial structure of the region is formed from 19 administrative units (four of them are the cities of a regional significance: Ust-Kamenogorsk, Semey, Ridder and Kurchatov) (Appendix 2, Map 2). The administrative center of the East Kazakhstan region is Ust-Kamenogorsk city.

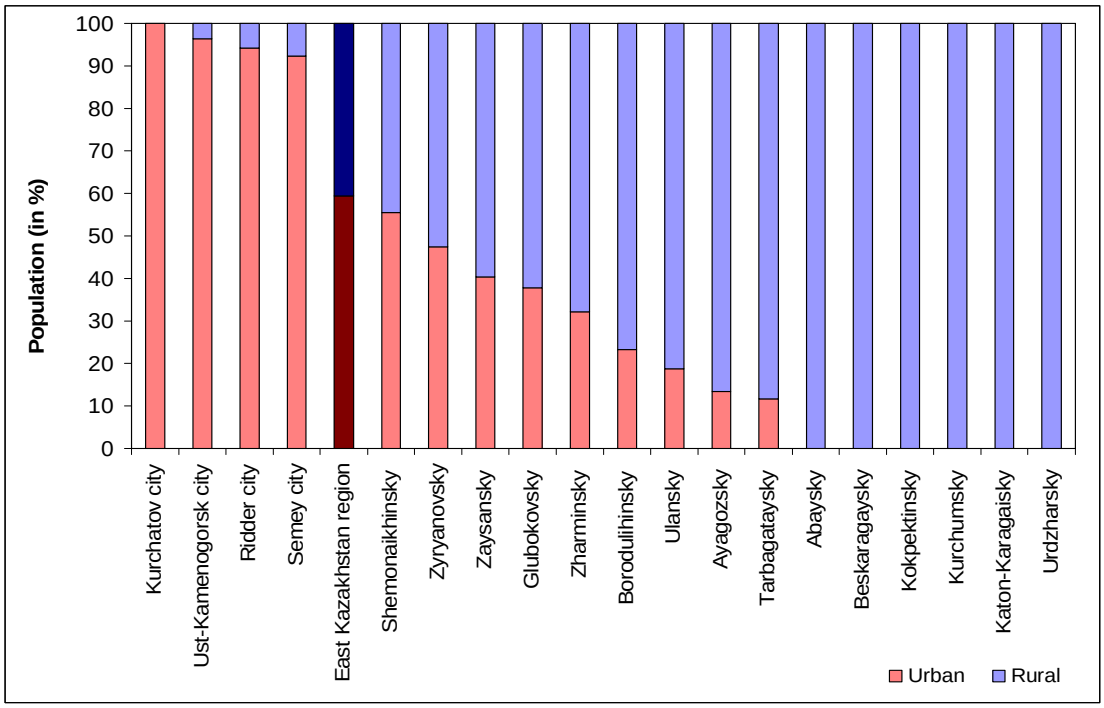
The leading branches of industry are non-ferrous metallurgy, mechanical engineering, architectural engineering, instrument-making, timber, light and food industries. Agricultural system is based on the cultivation of crops and stock-breeding. Major cities are located in industrial areas, because urbanization of Kazakhstan and East Kazakhstan has taken place only in industrial centers, which was the policy of the Soviet Union (http://www.eastonline.kz). From this economic orientation the districts are divided into two groups:

1. Industrial districts, mostly in the north of the region (as Ust-Kamenogorsk, Ridder, Kurchatov, Semey cities, Shemonaikhinsky, Zaysansky, Borodulihinsky, Glubokovsky, and Zyryanovsky districts).
2. Agricultural districts, mostly in the south and east of the region (as Abaysky, Ayagozsky, Beskaragaysky, Katon-Karagaisky, Kokpektinsky, Kurchumsky, Ulansky, Urdzharsky, Tarbagataysky, and Zharminsky districts).

According to the type of settlements districts are subdivided into five categories: namely, (1) Districts with 100 per cent of rural population. (2) Districts with 100 per cent of urban population. (3) Districts with mixed of urban and urban population where urban population is more prevalent more than 50 per cent. (4) Districts with mixed urban and rural population where rural population is more prevalent (more than 50 per cent). (5) Semey and Ust-Kamenogorsk cities.

In the first category there are Abaysky, Beskaragai, Kokpektinsky, Katon-Karagaisky, Kurchumsky, and Urdzharsky districts. Kurchatov city is the second category. Ridder city and Shemonaikhinsky district are included into the third district. The fourth category includes other districts (Ayagozsky, Borodulihinsky, Glubokovsky, Zharminsky, Zaysansky, Zyryanovsky, Tarbagataysky, and Ulansky). Ust-Kamenogorsk and Semey cities are taken as separate subgroup because these cities have a regional subordination, and they are the main trade and financial centers of the region and the largest cities of the region (Fig. 2).

Fig. 2: Urban and rural population by districts, East Kazakhstan region, 2006



Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

According to the data of the East Kazakhstan regional Department of Statistical office, on the 1st of July, 2008 population size was 1,417.4 thousand people and the average density of the population was 5.0 people per 1 km^2. Population size and density by districts were different between each other. Since the territory of Ust-Kamenogorsk and Kurchatov cities is small (0.5 and 0.002 thousand square kilometers) the population density was 552.1 and 5,284.5 people per square kilometer in 2008. Population size was higher in industrial districts than in agricultural districts and correspondingly population density in industrial districts was higher too. For

instance, if in Shemonaikhinsky district the population density is 12.5 people per square kilometer, while, in Katon-Karagaisky district the population density is 2.9 people per square kilometer. The same situation is observed among the other districts. The most sparsely populated among these districts is Abaysky district, where population density is 0.8 people per square kilometer. Also we can see that in the districts with prevailing urban population the population density is higher than in the districts with prevailing rural population. From this we conclude that urbanization process develops at high speed. It should be noted, that the population of Ayagozsky and Zyryanovsky districts includes the population of the cities Ayagoz and Zyryanovsk.

Tab. 1: East Kazakhstan region and its districts, 2008

Districts	Year of foundation	Territory (thousand sq.km)	Population (in thousand)	Population density (per 1 sq.km)
East-Kazakhstan region	**1932**	**283.2**	**1,417.4**	**5.0**
Ust-Kamenogorsk city	1720	0.5	298.1	596.2
Semey city	1718	27.8	310.3	11.2
Ridder city	1786	3.4	59.3	17.4
Kurchatov city	1947	0.0*	10.6	5300.0
Abaysky	1928	21.1	15.8	0.7
Ayagozsky**	1930	49.6	74.6	1.5
Beskaragaysky	1926	11.4	23.8	2.1
Borodulihinsky	1944	7.0	40.8	5.8
Glubokovsky	1964	7.3	65.5	9.0
Zharminsky	1928	23.4	48.9	2.1
Zaysansky	1968	10.5	38.2	3.6
Zyryanovsky**	1947	10.6	82.4	7.9
Katon-Karagaisky	1928	13.2	38.5	2.9
Kokpektinsky	1780	14.6	38.3	2.6
Kurchumsky	1927	23.2	38.7	1.7
Tarbagataysky	1928	23.7	59.0	2.5
Ulansky	1928	9.6	40.8	4.3
Urdzharsky	1928	23.4	82.6	3.5
Shemonaikhinsky	1928	4.0	49.5	12.4

**Note: ***The territory of Kurchatov city is 0.002 thousand sq.km
******Including Ayagoz city
******Including Zyryanovsk city

Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

7.2 Historical background of the region

The East Kazakhstan region is a territory which connects South Siberia and Altai region with Semirechie and Middle Asia. In 1718, Vasilij Cheredovoy, an envoy of the Russian tsar Peter the Great, founded the fortress Semipalatnaya (today called Semipalatinsk or Semey) on the ruins of a Jungarian monastery-fortress. In 1720, a major of the army of Peter the Great founded Ust-Kamenogorsk fortress. For many decades Semipalatinsk and Ust-Kamenogorsk were the main centers of trade for the region. The trade routes from Russia to Middle Asia, China and Mongolia all crossed here. On the basis of the decree of the Senate of 1760 and 1762, the

Russian government exiled peasants from the Russian provinces, including convicts and political prisoners. At the end of the nineteenth century, when the Great Siberian Railroad was constructed, mass migration started. Little by little, the migrants from Russia's central provinces settled on the banks of the Irtysh and in the Belagach steppe. During the nineteenth and twentieth centuries the Kazakhs gradually abandoned their nomadic lifestyle and began to settle in the developing towns and cities. The treasures of the Altai defined the intense development of the mining industry. The most famous deposits of polymetal ores were exploited in the nineteenth century, among them Ziryanovsk deposit, Ridder deposit, and Belousov deposit. The history of the East Kazakhstan region is in close connected with the history of the former USSR and Russia. It went through the revolutions of 1905-1907, 1917, through the Civil War, and Stalin's repression between 1930 and the 1950s. During the Great Patriotic War, the East Kazakhstan region supplied the battlefront lead, cooper, cadmium, tin, metal antimony and other metals, which were extremely important to produce ammunition and arms. During the period from 1947 to 1989, about 500 nuclear explosions were carried out in Semipalatinsk nuclear testing area. The explosions caused great damage to the health of many people as well as to the environment. Since 1991, Kazakhstan has been an independent state and the East Kazakhstan region has taken an active part in its political, social and economic life. After the independence in 1991 this nuclear testing area was closed due to the efforts of the international movement "Nevada-Semipalatinsk". East Kazakhstan and Semipalatinsk regions were separate regions till 1997. In Kazakhstan there was administrative-territorial division and Semipalatinsk region was included into the structure of the East Kazakhstan region in 1997. It should be noted, that in one's subsequent work the information concerning the region included the facts from the both regions.

The ethnic composition of the region has been founded by long-term movements of the population since the time when Kazakhstan was a part of Tsarist Russia's empire and then in the Soviet Union period. The ethnic structure of the population was changed by migration. Migration of population was not a spontaneous process. Migration had its own long history. Military, administrative and stimulated colonization of the people by the Government led to the formation of Slavic settlements in the north-west, north and east of Kazakhstan ranges. Infiltration of the Slavic population led to significant change in the ethnic structure of the population and economic structure of the Kazakhs. This distribution of the population brought ethnic lines due to historical events of the region. It was the resettlement policy of Russian Empire and of the Soviet Union in the 19-20th centuries. The first settlers were Russian peasants who were settled along the bank of the river Irtysh. However, 'until the mid of the nineteenth century the population size and ethnic composition of the population who have been living in the present boundaries of the East Kazakhstan region is difficult to determine. Relatively reliable demographic statistics appeared in the late sixties of the nineteenth century' (Alekseenko, 1994:4). The Slavic population on the territory of Kazakhstan before the mass

peasant colonization (in 1870) was represented mainly by two groups: Cossacks and peasantries of Rudnyi Altai. The territory of Kazakhstan has three Cossack troops: Ural, Siberian and Semirechensk. The East Kazakhstan region was in Siberian troop (Tarasova, 2004). At the end of the 60s of the 19th century Cossack colonization almost ceased. The first peasant settlements in the territory of the modern East-Kazakhstan region were connected with the accession of the Upper Irtysh to Russia. There were resettled farmers from Russia.

In the early 20th century after the revolution (1905) in Russia the agrarian reform and the new course of migration policy of Russian autocracy was adopted by Stolypin. Stolypin was the head of the Council of ministers in tsarist Russia. He enacted a new Law "The rules about movement at public lands (Pravila o pereselenii na kazennye zemli)". After this new waves of landless peasants moved to the Kazakh steppe. Since 1907 German peasants began to move to the territory of the region. In the period of 1897-1916 130.1 thousand people moved into Semipalatinsk region (Masanov, 2001:244-246).

In the Soviet period migration in Kazakhstan largely led to the transformation of the Kazakhs' lifestyle from nomadic to settled, and the program for agricultural and industrial development of the republic intensified this process. During this transformation there was a mass emigration due to the famine of 1921-1922. Analysis of 1920 and 1926 census data showed that the population growth in Kazakhstan, in the period of 1920-1926 amounted to only 2.8 per cent, and in the regions of Kazakhstan, especially in the northern and eastern parts, even less (Alekseenko N.V., Alekseenko A.N., 1999:116-117).

In the late 1930s a lot of Soviet people were deported to Kazakhstan by Stalin's decision. They are: Poles from Western Ukraine and Western Belarus (1936), Koreans from Primorye and Sakhalin Territory (Russia) (1937), during the war Germans from the Volga were deported (1941), Greeks from the Krasnodar Territory (1941), Karachay and Balkar (1943), as well as Chechens and Ingush (1944) from the North Caucasus, the Crimean Tatars from the Crimea (1944). A share of them was transferred to the present territory of the East Kazakhstan region. In connection with this Kazakhstani ethnic structure of population was diluted by new ethnic groups. According to All-Union Census in 1939 in the East Kazakhstan region there were 21.6 per cent of Kazakhs, 68.7 per cent of Russians, 5.1 per cent of Ukrainians, 0.8 per cent of Germans, 3.8 per cent of others. In Semipalatinsk region there were 36.2 per cent of Kazakhs, 49.1 per cent of Russians, 7.7 per cent of Ukrainians, 1.1 per cent of Germans, 5.9 per cent of others (Masanov, 2001: 385, 588, 589).

The period of the Second World War marked an increase in industrialization and increased mineral extraction in support of the war effort. There were a lot of Germans who were departed in the period of the Great Patriotic War (1941-1945) and after it. In 1941 into the East Kazakhstan region 32 thousand people moved (Kekilbayev et. al., 1998:196).

In 1953 the Soviet leader Nikita Khrushchev initiated the process of turning the traditional pasturelands of Kazakhstan into a major grain-producing region for the Soviet Union.

The Virgin Lands policy, along with later modernizations under the Soviet leader Leonid Brezhnev, sped up the development of the agricultural sector, which to this day remains the source of livelihood for a large percentage of Kazakhstan's population (http://www.state.gov/r/pa/ei/bgn /5487.htm). During “Virgin Lands” period new residents were coming from Russia, Belarus and Ukraine. According to the All-Union Census 1959 in East Kazakhstan region there were 18.9 per cent of Kazakhs, 70.9 per cent of Russians, 2.3 per cent of Ukrainians, 3.1 per cent of Germans, 34.9 per cent of others. In the Semipalatinsk region there were 35.8 per cent of Kazakhs, 45.2 per cent of Russians, 3.3 per cent of Ukrainians, 8.3 per cent of Germans, 7.4 per cent of others (Masanov, 2001:385, 588, 589).

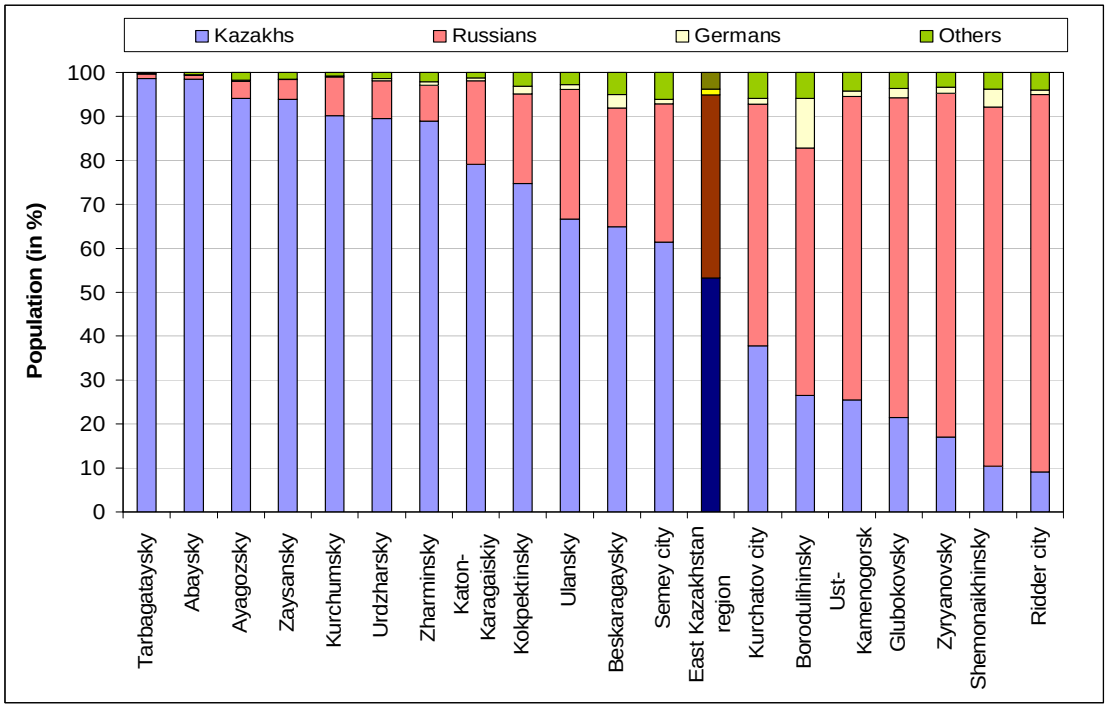
‘Thereby, the vast influence on formation of ethno demographic situation in Kazakhstan was given by migration till 1960s. Since 1960 migration flow markedly reduced by the background of increasing natural growth of the Kazakhs, which researchers called the population "explosion". Since then, the natural population growth begins to dominate over the migration. After the world energy crisis in 1973-1979 investment of capital shrank and Kazakhstan again becomes a distant periphery. From 1968 net migration was negative and tendencies of mass emigration increased with every ten years in Kazakhs as well as Russians in Kazakhstan and the East Kazakhstan region. The emigration in the 60-80s of the twentieth century was caused by hidden social-economic motives’. The population ethnic composition was followed by the All-Union Census 1970: in East Kazakhstan region there were 23.2 per cent of Kazakhs, 69.5 per cent of Russians, 1.9 per cent of Ukrainians, 2.6 per cent of Germans, and 2.8 per cent of others. In the Semipalatinsk region there were 43.6 per cent of Kazakhs, 41.0 per cent of Russians, 2.6 per cent of Ukrainians, 6.6 per cent of Germans, 6.2 per cent of others (Masanov, 2001: 409-411, 592-593).

‘After the collapse of the Soviet Union and achieving the independence a new migration system has been formed in Kazakhstan. The mass emigration of Russian-Slavic’s and German’s from Kazakhstan concurs with deep social-economic crisis. In the period of Independence the emigration of Russian-speaking population was more than two million and emigration of Germans was more than half a million, and also other ethnic group emigrated with high intensity’ (Masanov et al., 2001:412). The most related cause of emigration is homecoming to “historical” motherland. The high concentration of European ethnics (Russians, Germans, etc.) in the East Kazakhstan region was strongly involved into this mass emigration process. In the period of 1993-1996 the value of negative international net migration in the East Kazakhstan region including Semipalatinsk region was 127.4 thousand (Masanov, 2001:414).

In 2008 the ethnic composition of the population in the region consisted of 53 per cent of Kazakhs, 42 per cent of Russians, 1 per cent of Germans and 4 per cent of other ethnic groups. In the industrial area of the region most people are of European ethnics (Russians, Germans and others) and most concentration of Kazakhs was observed in the agricultural and cattle production area. The districts where proportion of Kazakhs was less than 50 per cent were

Kurchatov city, Borodulikhinsky, Glubokovsky, Zyryanovsky, Shemonaikhinsky districts, Ust-Kamenogorsk and Ridder cities. Also in these districts the proportion of European ethnic groups, especially Russians, was more than 50 per cent. In other districts the proportion of Kazakhs was more than 50 per cent. The lowest number of Kazakhs was observed in Ridder city (8 per cent). The highest proportion of Germans lived in Shemonaikhinsky district (11 per cent). In Semey city there is a big share of Kazakhs (61 per cent) which can be explained by the fact that adjacent areas of Semey city were inhabited by Kazakhs, whereas, in Ust-Kamenogorsk city Russians were concentrated (69 per cent). The highest proportion of Russians was in Ridder city, Shemonaikhinsky district and in Zyryanovsky districts (86 per cent, 82 per cent, and 78 per cent, respectively) (Fig. 3).

Fig. 3: Ethnic composition of population by districts, East Kazakhstan region, 2008



Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

8 Population size and age-sex structure development in the East Kazakhstan region and its subdivisions

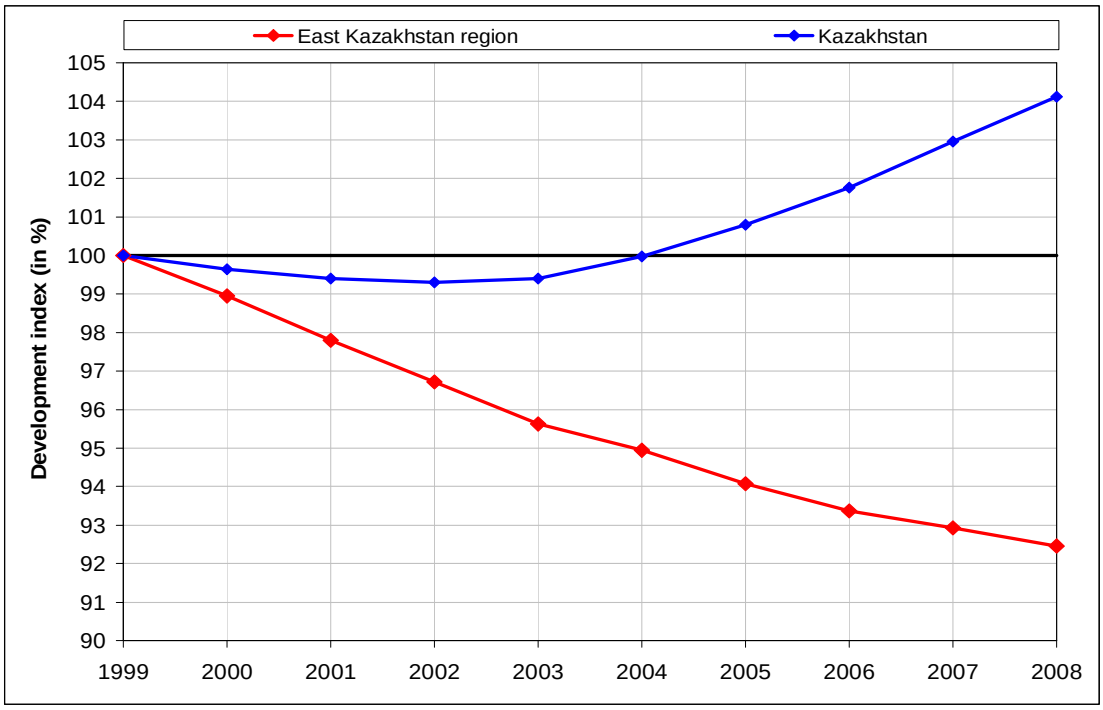
In this part of the study we intend to explore the development of population size and age structure in the East Kazakhstan region as a whole, and in its subdivisions: urban rural settlements and districts. The population development at the regional level (with urban and rural areas) is given in comparison with Kazakhstani demographic development.

8.1 Regional level

The comparison of population change in Kazakhstan and in the East Kazakhstan region was analyzed by development index of population in 1999-2008. The compared objects were population of Kazakhstan and the East Kazakhstan region in total, urban and rural areas in 1999-2008.

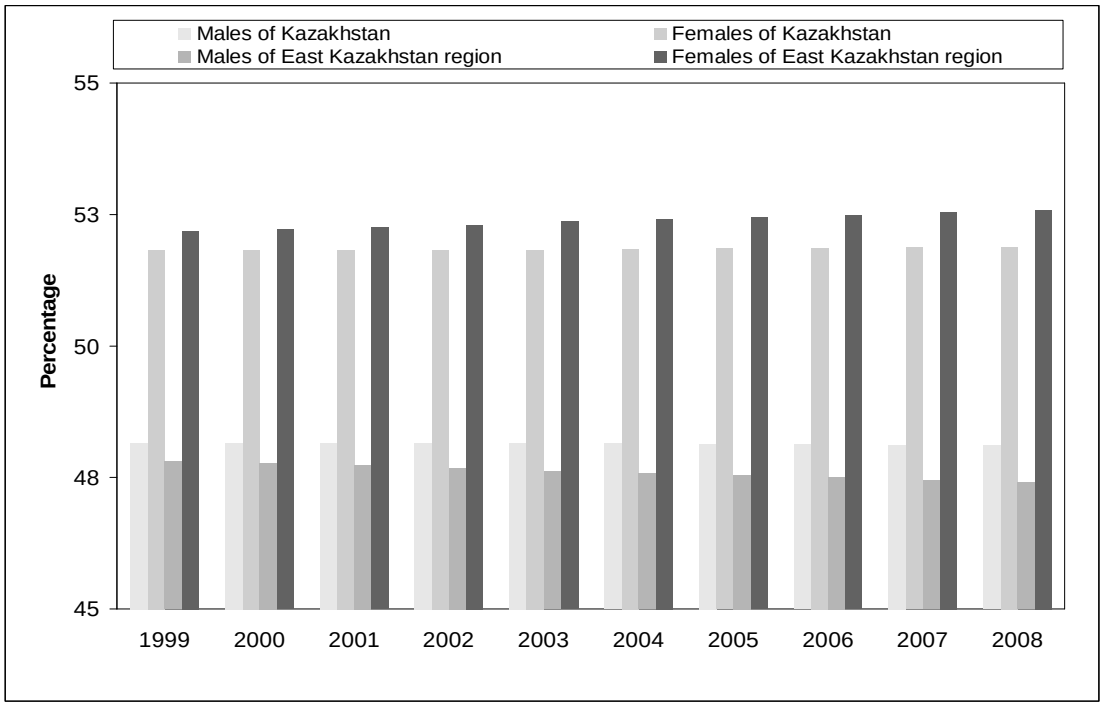
Population of the Republic of Kazakhstan increased to 4.1 per cent in 1999-2008, while the population of the East Kazakhstan region declined to 7.5 per cent during the same period. The population of the Republic of Kazakhstan declined in 1999-2003, and in 2004-2008 increased. In the East Kazakhstan region population declined during all the considered time period. Annually this decrease in the region was about 1 per cent point, while in Kazakhstan the increase was 1 per cent point from 2005 to 2008 (Fig. 4). The population growth in Kazakhstan was caused by increasing natality level as well as by changing the balance of international migration to a positive value from 2004 to 2008. For example, in Kazakhstan the natural change of population in 2004 in comparison with 1999 increased more than one and half times (in 1999 the natural change rate was 4.7 per mile and 8.0 per mile in 2004), while international net migration decreased from negative 8.3 per mile in 1999 to positive 0.2 per mile in 2004 (Agenstvo statistiki Respubliki Kazakhstan, 2008).

Fig. 4: Population development, Kazakhstan and East Kazakhstan region, 1999-2008, (1999=100 %)



Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

Fig. 5: Population by sex, Kazakhstan and East Kazakhstan region, 1999-2008

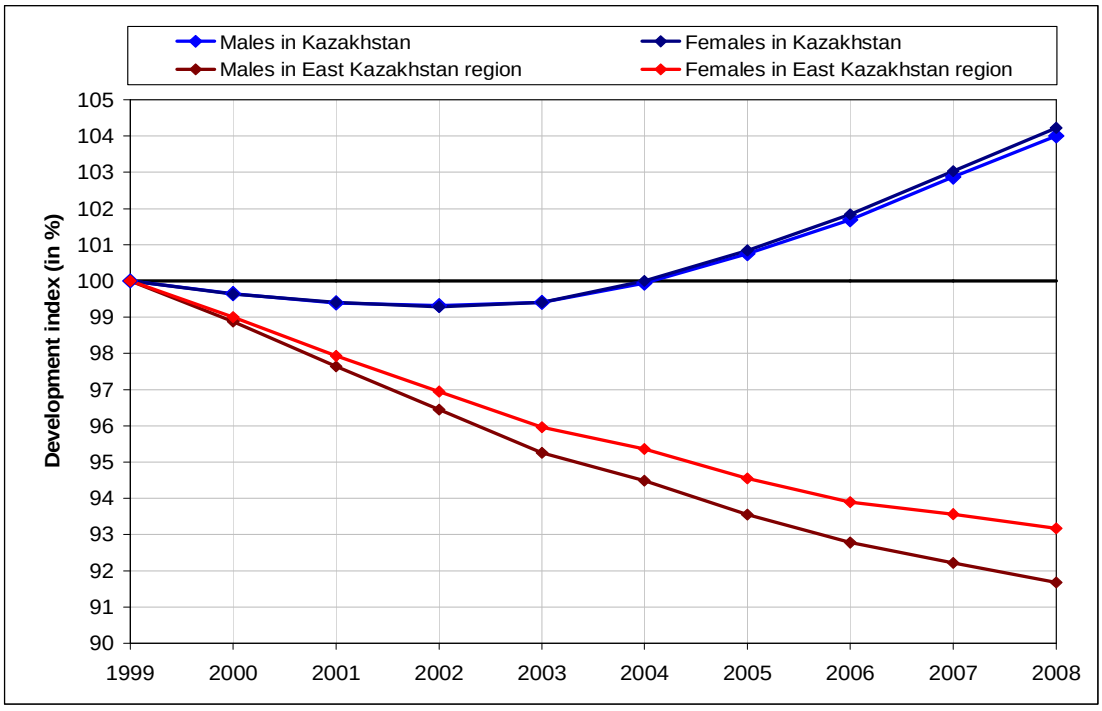


Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

The change in the proportion of males and females in Kazakhstan and the East Kazakhstan region was the following: in 1999-2008 the proportion of males in Kazakhstan and

the East Kazakhstan region was lower than the proportion of females. However, the proportion of males in the East Kazakhstan region was lower than in Kazakhstan, and conversely, the proportion of females was higher. In 1999 there was 47.8 per cent of males and 52.2 per cent of females in the region, while in Kazakhstan at the same time there was 48.2 per cent and 51.8 per cent of males and females respectively. From 2004 to 2008 the proportion of males decreased to 0.1 per cent point and of females increased to 0.1 per cent point annually in Kazakhstan. The total change was 0.1 per cent point for both sexes in 1999-2008. The same process was observed in the region, but it was higher than in Kazakhstan to 0.3 per cent point, it means that the total change for males and females became 0.4 per cent point. Male population decreased to 0.1 per cent point and female population increased to 0.1 per cent point every two years since 2000 (Fig. 5). The fact that the proportion of population by sex in the East Kazakhstan region changed earlier can be the result of mass emigration as well as excess males' mortality, because in industrial areas males' mortality is higher than in agricultural regions, since males' jobs at heavy industries have higher mortality risks (Sheriyazdanova, 2004).

Fig. 6: Population development by sex, Kazakhstan and East Kazakhstan region, 1999-2008, (1999=100 %)



Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

The development of population size by sex was the following: in Kazakhstan the number of males and females increased to 4.0 and 4.2 per cent in 1999-2008, whereas in the same period the change of male and female size at the level of the East Kazakhstan region decreased to 8.3 per cent and 6.8 per cent, respectively (Fig. 6). The difference between sexes in population change highlighted that in Kazakhstan the number of females was higher than the number of males to 0.2 per cent point, but in general this difference was insignificant.

However, in the East Kazakhstan region this difference was 1.5 per cent point (Fig. 6). The fact that in the region males' and females' size development had this difference can be explained by excess male mortality and migration of females.

Tab. 2: Population by age, Kazakhstan and East Kazakhstan region, 1999-2008

	Kazakhstan			East Kazakhstan region		
	0-14	15-64	65+	0-14	15-64	65+
	Absolute number (in thousand)					
1999	4,295.7	9,652.5	1,006.9	382.9	1016.4	133.7
2000	4,172.1	9,730.6	998.9	366.5	1018.7	131.6
2001	4,056.4	9,800.3	1,009.0	350.2	1017.3	131.6
2002	3,936.5	9,871.2	1,043.4	332.9	1014.8	134.8
2003	3,822.2	9,959.4	1,085.2	316.5	1009.8	139.7
2004	3,741.9	10,083.1	1,126.2	303.4	1008.2	143.8
2005	3,700.5	10,210.9	1,163.3	291.3	1003.8	147.0
2006	3,680.6	10,344.7	1,194.0	282.8	999.2	149.2
2007	3,691.7	10,497.3	1,207.9	277.6	997.6	149.3
2008	3,729.9	10,635.6	1,206.0	274.3	996.2	146.9
	Percentage					
1999	28.7	64.5	6.7	25.0	66.3	8.7
2000	28.0	65.3	6.7	24.2	67.2	8.7
2001	27.3	65.9	6.8	23.4	67.9	8.8
2002	26.5	66.5	7.0	22.5	68.5	9.1
2003	25.7	67.0	7.3	21.6	68.9	9.5
2004	25.0	67.4	7.5	20.8	69.3	9.9
2005	24.5	67.7	7.7	20.2	69.6	10.2
2006	24.2	68.0	7.8	19.8	69.8	10.4
2007	24.0	68.2	7.8	19.5	70.0	10.5
2008	24.0	68.3	7.7	19.4	70.3	10.4

Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

The main age groups in population distribution are children (aged 0-14 years), working age population (15-64 years old), and people at older ages (aged 65 years and over). In the region and in Kazakhstan the general trends in distribution of these age groups were increasing proportion of working age population and of people older than 65 and decreasing number of children in 1999-2008. In Kazakhstan the proportion of children decreased from 28.7 per cent in 1999 to 24.0 per cent in 2008, whereas the working age population and people older than 65 increased from 64.5 per cent to 68.3 per cent and from 6.7 per cent to 7.7 per cent during the considered period, respectively. In the East Kazakhstan region the development trends in the main age groups were the same as at the national level. It means that the proportion of working age population and people older than 65 increased and number of children decreased, the difference was only in their values. From 1999 to 2008 in the East Kazakhstan region people older than 65 and working age population increased from 8.7 per cent to 10.4 per cent and from 66.3 per cent to 70.3 per cent, correspondingly. The proportion of children decreased from 25.0 per cent in 1999 to 19.4 per cent in 2008. From this we note that in the region the proportion of working age population and people older than 65 was higher than at the national level, while the proportion of children was lower (Tab. 2).

Tab. 3: Population by sex and age, Kazakhstan, 1999, 2004, 2008

	1999		2004		2008	
	Males	Females	Males	Females	Males	Females
Absolute number (in thousand)						
Total population	7,203.0	7,752.2	7,199.0	7,752.2	7,491.6	8,080.0
0-14	2,187.5	2,108.2	1,911.5	1,830.4	1,909.6	1,820.4
15-64	4,669.2	4,983.3	4,885.7	5,197.4	5,158.2	5,477.4
65+	346.3	660.7	401.8	724.4	423.8	782.2
Percentage						
Total population	100.0	100.0	100.0	100.0	100.0	100.0
0-14	30.4	27.2	26.6	23.6	25.5	22.5
15-64	64.8	64.3	67.9	67.0	68.9	67.8
65+	4.8	8.5	5.6	9.3	5.7	9.7

Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

Tab. 4: Population by sex and age, East Kazakhstan region, 1999, 2004, and 2008

	1999		2004		2008	
	Males	Females	Males	Females	Males	Females
Absolute number (in thousand)						
Total population	732.9	800.0	692.5	762.9	675.9	748.6
0-14	195.0	187.9	154.8	148.6	141.7	135.9
15-64	493.3	523.2	488.1	520.2	482.8	514.9
65+	44.7	89.0	49.6	94.2	51.4	97.9
Percentage						
Total population	100.0	100.0	100.0	100.0	100.0	100.0
0-14	26.6	23.5	22.4	19.5	21.0	18.1
15-64	67.3	65.4	70.5	68.2	71.4	68.8
65+	6.1	11.1	7.2	12.3	7.6	13.1

Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

If we breakdown the proportion of children, working age population and people over 65 years old by sex, we see that the proportion of females in age groups of children and working age population was lower than males in the same age groups in the region and in Kazakhstan in 1999, 2004 and 2008. However, females' proportion in age group 65 years and older exceeded males' proportion at the same age group in these years. For instance, in Kazakhstan males' proportion at age group of children was 30.4 per cent, 26.6 per cent, and 25.5 per cent in 1999, 2004, and 2008. Females' proportion in the same age group was 27.2 per cent, 23.6 per cent, and 22.5 per cent in these years. The proportion of working age male population was 64.8 per cent, 67.9 per cent, and 68.9 per cent, and the proportion of female population was 64.3 per cent, 67.0 per cent, and 67.8 per cent in the same years. The proportion of people over 65 years old in this period was the following: 4.8 per cent, 5.6 per cent, and 5.7 per cent for males and 8.5 per cent, 9.3 per cent, and 9.7 per cent for females (Tab. 3).

In the region males' proportion in age group of children was 26.6 per cent, 22.4 per cent, and 21.0 per cent, and females' proportion was 23.5 per cent, 19.5 per cent, and 18.1 per cent in 1999, 2004, and 2008. Males' proportion in working age group was 67.3 per cent, 70.5 per cent, and 71.4 per cent, and females' proportion was 65.4 per cent, 68.2 per cent, and 68.8 per cent in the same

years. The proportion of people older than 65 was the following in this period: 6.1 per cent, 7.2 per cent, and 7.6 per cent for males; 11.1 per cent, 12.3 per cent, and 13.1 per cent for females (Tab. 4).

If we are keeping in mind that people in older ages migrate with very low intensity, then probably the gap in proportion of males and females in older ages was the reason of males' mortality. In the region the proportion of males in age group older than 65 was twice lower, which proves that excess males' mortality takes place. The fact that the proportion of people older than 65 was higher than 7 per cent showed that in the region as well as in Kazakhstan the process of population ageing took place. As for the decrease of children's proportion, it was a reason of natality decrease and high infant mortality for both sexes in the region.

Tab. 5: Sex ratio by age, Kazakhstan and East Kazakhstan region, 1999, 2003, and 2006 (male share per 100 females)

Age	Kazakhstan			East Kazakhstan region		
	1999	2003	2006	1999	2003	2006
0	106	104	106	103	103	104
1-4	104	106	105	103	103	105
5-9	104	104	105	104	104	104
10-14	103	103	104	104	104	104
15-19	103	103	103	103	103	104
20-24	100	102	103	102	102	103
25-29	99	99	100	102	102	101
30-34	97	98	97	97	97	99
35-39	95	95	96	96	96	96
40-44	92	92	92	93	93	92
45-49	88	88	89	90	90	89
50-54	85	84	83	86	86	84
55-59	79	80	78	80	80	79
60-64	79	72	71	77	77	71
65-69	70	71	66	68	68	64
70-74	53	59	60	52	52	56
75-79	39	43	47	35	35	46
80-84	33	34	34	30	30	32
85+	26	25	28	25	25	25

Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

The sex ratio of population shows the ratio of males per 100 females. The sex ratio is an indicator of males' and females' proportion in particular age groups. It means that from the sex ratio we can observe in which age group females exceed males. In Kazakhstan the prevalence of females over males was in age group 25-29 years in 1999 and 2003, but in 2006 it shifted to age group 30-34 years. However, in the East Kazakhstan region the prevalence of females over males was in age group 30-34 years in 1999, 2003, and 2006. The prevalence of females over males increased age by age. In age group 85 years and over in the East Kazakhstan region the ratio was 25 males per 100 females in 1999, 2003, and 2006 and in Kazakhstan it was 26, 25, and 28 males per 100 females in 1999, 2003, and 2006, respectively. It should be noted that in the East Kazakhstan region as well as in Kazakhstan in age group70-74 years there was a rapid decrease of the male proportion. For instance, in Kazakhstan and the East Kazakhstan region in

2006 if in age group 70-74 years there were 60 and 56 males per 100 females, then in age group 75-79 years there were 47 and 46 males per 100 females, respectively (Tab.5).

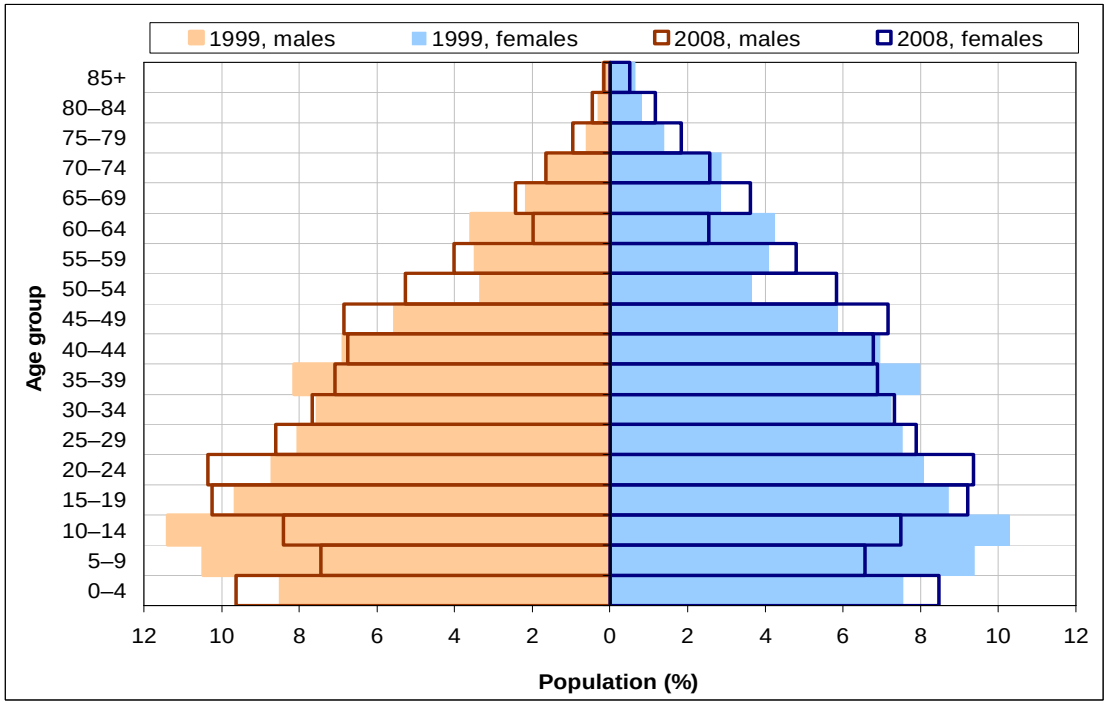
Another distribution of population age groups according to sex can be shown by age and sex pyramid of population. The age structure of the population as "a mirror of memory" embodies changes of natality, mortality of the population, and big movement of the population (migration) and then reproduces them in decades.

We can compare population age-sex structure of Kazakhstan and the East Kazakhstan region in 1999 and 2008. The population age-sex structure of Kazakhstan and East Kazakhstan region was much deformed by social perturbations, repeated throughout the 20th century. World War I, Civil War, collectivization, swift industrialization, followed by great migrations of the population, World War II and other well-known shocks resulted in sharp falls and formed gaps in the age structure of the population, which were followed by the compensational rises. In 1999 and 2008 age and sex pyramids of the population showed the following distribution of the population by age and sex: As in the Republic of Kazakhstan, in the East Kazakhstan region the highest proportion of population in both sexes was age group 10-14 years in 1999, in 2008 − age groups 15-19 and 20-24 years. They are the baby-boom generation of 1980s. In age pyramids of Kazakhstan as well as of the East Kazakhstan region we had "gaps" in age groups 30-34 years, 50-54 years, and 65-74 years in 1999. It is called "a gap" because it is not only irregularity in age pyramid. It is abnormal distribution of population in structure. The "gap" in age group 65-74 years can be explained as consequences of famine in the 1930s in Kazakhstan, including the East Kazakhstan region. In that period the region lost a significant portion of its population, especially in the Kazakh ethnic group (because of the mortality increase and large emigration) (Alekseenko A.N., 1992:76-78). In 1999 the "gap" in age group 50-54 years was a reason of the Great Patriotic War when the number of newborn babies was very low, and perinatal mortality and child mortality were very high. In the age pyramid of 2008 this gap in age structure shifted to age group 60-64. There we can also see the additional gap from births at the end of the 20th and beginning of the 21st centuries (age group 5-10 years). The population of this age group was a generation of the 1990s, when the natality in the country and in the region declined rapidly (Fig. 7, Fig. 8).

In both age pyramids very low number of population after the age group 75 years and over was a result of natural selection of population. Only a little number of people can survive till the oldest ages. In both age pyramids we observe that the number of males was less than females particularly after the age group 50 years and over years and this number merely increased year by year. For example, if in the age pyramid of the East Kazakhstan region the proportion of males in age group 50-54 years was 6.4 per cent in 2008, the number of females of the same age and in the same period was 7.0 per cent, then in the age group 80-84 years the proportion of males and females were 0.6 per cent and 1.6 per cent respectively. The proportion of males and females in Kazakhstan

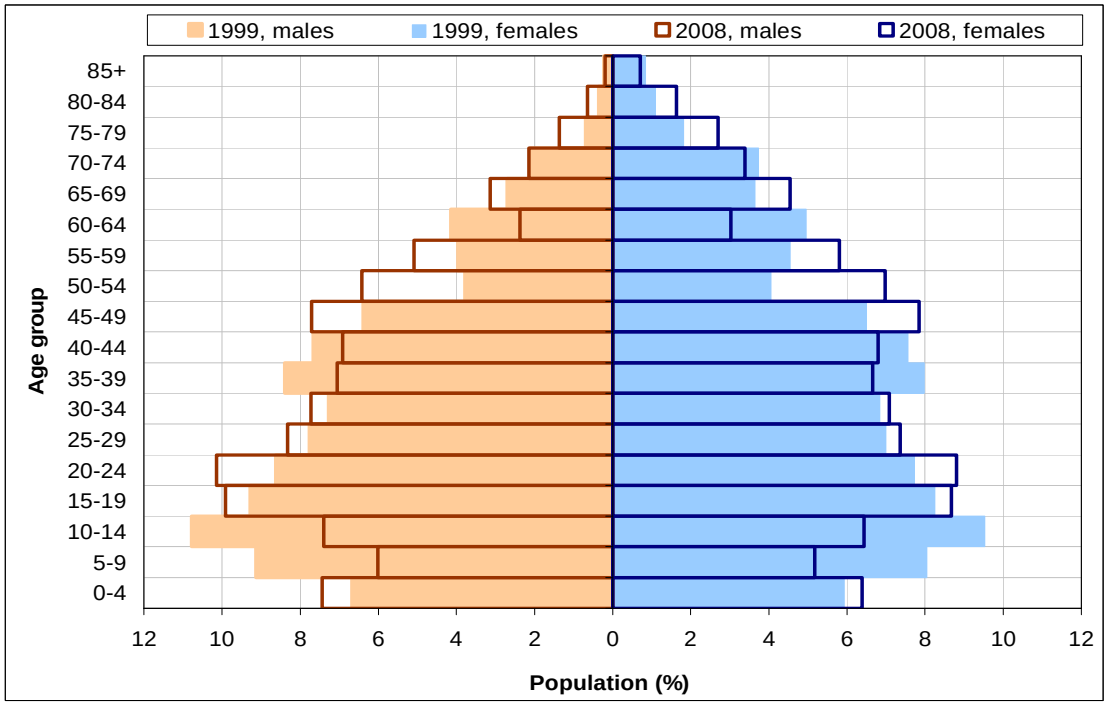
was 5.3 and 5.8 per cent in age group 50-54 years, in age group 80-84 years - 0.5 and 1.2 per cent, respectively (Fig. 7, Fig. 8).

Fig. 7: Age and sex structure of population, Kazakhstan, 1999 and 2008



Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

Fig. 8: Age and sex structure of population, East Kazakhstan region, 1999 and 2008

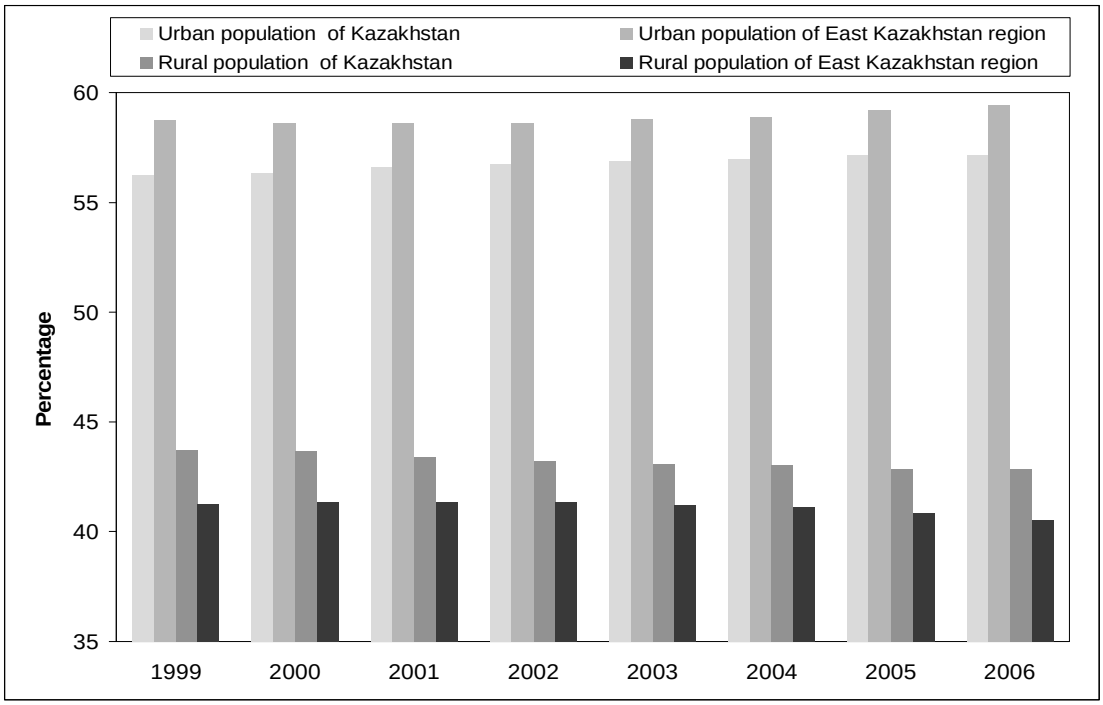


Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

8.2 Urban and rural settlements of the region

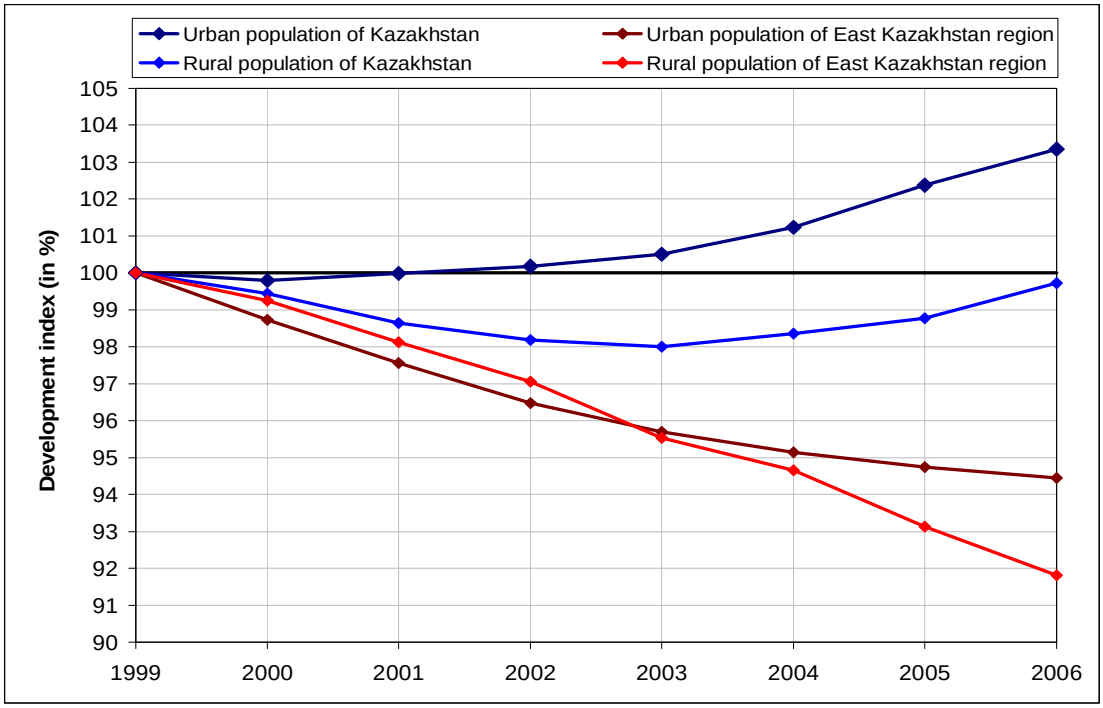
The demographic development in urban and rural areas gives a more broadened delineation of the issue about the development of population. There were more inhabitants in urban settlements of Kazakhstan than in rural areas, which was similar with the East Kazakhstan region. For instance, 56.3 per cent of population lived in the urban settlements of Kazakhstan in 1999, and in the rural areas there was 43.7 per cent. In 2006 these values were 57.1 per cent and 42.9 per cent respectively. In the region proportion of urban and rural areas was higher than in Kazakhstan. The proportion of the population of the urban settlements of the region was 58.8 per cent in 1999 and 59.4 per cent in 2006. Conformably, the proportion of the population of rural settlements was 41.2 per cent in 1999 and 40.6 per cent in 2006. The urban population of Kazakhstan increased to 0.9 per cent point, at the same time the population of rural areas decreased by 0.9 per cent point in 1999-2006. As for the East Kazakhstan region, the decrease of rural population and the increase of urban population were 0.7 per cent point. Annually the proportion of urban and rural population changed to 0.1-0.2 per cent point for both types of settlements in Kazakhstan as well as in the region (Fig. 9).

Fig. 9: Distribution of population by type of settlements, Kazakhstan, East Kazakhstan region, 1999-2006



Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

Fig. 10: Population development by type of settlements, Kazakhstan and East Kazakhstan region, 1999-2006 (1999=100 %)



Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

The development of population size of urban and rural population was the following: in Kazakhstan the population of urban areas increased to 3.4 per cent in 1999-2006, while in the East Kazakhstan region it decreased to 5.6 per cent. In the region rural population decreased to 8.2 per cent. However, the development of rural population in comparison with national level was different: in Kazakhstan rural population decreased from 1999 to 2003, but from 2004 to 2006 increased (Fig. 10). If the increase of urban population was mostly a result of rural-urban migration, since the level of natality in urban areas was low, then in rural areas the increase was a result of natality as well as migration of oralmans in Kazakhstan. Since most of the oralmans are agricultural workers and farm-hands, this factor leads oralmans to living in rural areas. In the region decline of the population in both types of settlements was a result of migration and negative natural change of population. East Kazakhstan region is included into the north-eastern ethno-demographic zone, where we observe old age structure of population, intended type of population reproduction, minimal or zero growth of population, and high level of negative net migration (Aubakirova, 2004).

The proportion of males and females at the level of urban and rural settlements was different. In both types of settlements of Kazakhstan females' proportion prevailed over males one. In rural area this prevalence was neglected till 2004 (0.1 per cent point). From 2004 the proportion of sexes was equal in rural settlements. In urban settlements females prevailed over males to 23-24 per cent point annually. In urban areas the proportion of males changed from 38.8 per cent in 1999 to 37.5 per cent in 2006, while, females from − 61.2 per cent to 62.5 per cent (Tab. 6).

In the East Kazakhstan region the proportion of males in urban settlements was lower than at the national level, while, in the rural settlements − higher. In rural areas this difference between the males' and females' proportion was unnoticeable (to 0.1-0.2 per cent point). In urban settlements the proportion of males changed from 46.8 per cent in 1999 to 46.7 per cent in 2006, whereas, in rural settlements − from 50.0 per cent in 1999 to 50.2 per cent in 2006. The proportion of males and females in urban and rural settlements of the region was stable at the level of 1999 till 2004. Since 2004 it changed to 0.1 per cent point for both sexes in both types of settlements (Tab. 6).

In urban areas the number of males decreased and the number of females increased. In the rural settlements this process was quite the contrary. It was a result of migration as well as mortality, since from rural areas females migrated with higher intensity than males. In rural areas mortality level was lower than in urban areas, especially males' mortality. In urban areas males' mortality was higher by two reasons: firstly, in urban areas motorization of population (the number of cars per one person) was higher, and the most registered cause of death was traffic accidents. Secondly, as we mention in previous chapters, most of the industrial objects are located in urban areas, and heavy industry workers (especially males) have higher mortality intensity than other jobs workers (Sheriyazdanova, 2004:326-334).

Tab. 6: Population by sex according to type of settlements, Kazakhstan and East Kazakhstan region, 1999-2008, (in %)

	Kazakhstan				East Kazakhstan region			
	Urban		Rural		Urban		Rural	
	Males	Females	Males	Females	Males	Females	Males	Females
1999	38.8	61.2	49.9	50.1	46.8	53.2	50.0	50.0
2000	38.7	61.3	49.9	50.1	46.8	53.2	50.0	50.0
2001	38.3	61.7	49.9	50.1	46.8	53.2	50.1	49.9
2002	38.0	62.0	49.9	50.1	46.8	53.2	50.1	49.9
2003	37.9	62.1	49.9	50.1	46.8	53.2	50.1	49.9
2004	37.7	62.3	50.0	50.0	46.8	53.2	50.1	49.9
2005	37.5	62.5	50.0	50.0	46.7	53.3	50.2	49.8
2006	37.5	62.5	50.0	50.0	46.7	53.3	50.2	49.8

Source: Data on the Agency of Statistics of the Republic of Kazakhstan

Tab. 7: Urban population by age, Kazakhstan and East Kazakhstan region, 1999-2006

	Kazakhstan			East Kazakhstan region		
	0-14	15-64	65+	0-14	15-64	65+
	Absolute number (in thousand)					
1999	2,131.5	5,649.2	633.7	197.4	616.4	87.1
2000	2,071.0	5,697.0	629.6	188.3	615.3	85.7
2001	2,023.9	5,753.3	636.2	179.9	613.2	85.8
2002	1,971.1	5,805.3	652.9	171.0	610.6	87.5
2003	1,922.1	5,857.3	677.7	163.5	608.1	90.3
2004	1,890.7	5,927.6	700.0	157.6	607.2	92.3
2005	1,886.4	6,008.1	720.2	152.4	607.1	93.9
2006	1,890.7	6,072.9	732.9	149.9	606.0	94.8
	Percentage					
1999	25.3	67.1	7.5	21.9	68.4	9.7

Tab. 7: continued (and also repeat table's header)

2000	24.7	67.8	7.5	21.2	69.2	9.6
2001	24.1	68.4	7.6	20.5	69.8	9.8
2002	23.4	68.9	7.7	19.7	70.3	10.1
2003	22.7	69.3	8.0	19.0	70.5	10.5
2004	22.2	69.6	8.2	18.4	70.8	10.8
2005	21.9	69.7	8.4	17.9	71.1	11.0
2006	21.7	69.8	8.4	17.6	71.2	11.1

Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

Tab. 8: Rural population by age, Kazakhstan and East Kazakhstan region, 1999-2006

	Kazakhstan			East Kazakhstan region		
	0-14	15-64	65+	0-14	15-64	65+
	Absolute number (in thousand)					
1999	2,164.2	4,003.3	373.2	185.5	400.1	46.6
2000	2,101.1	4,033.6	369.3	178.2	403.4	45.9
2001	2,032.5	4,047.0	372.8	170.3	404.1	45.9
2002	1,965.4	4,065.8	390.5	162.0	404.2	47.4
2003	1,900.1	4,102.0	407.5	152.9	401.6	49.4
2004	1,851.2	4,155.6	426.2	145.8	401.1	51.5
2005	1,814.1	4,202.8	443.1	139.0	396.7	53.1
2006	1,789.9	4,271.8	461.0	132.9	393.2	54.4
	Percentage					
1999	33.1	61.2	5.7	29.3	63.3	7.4
2000	32.3	62.0	5.7	28.4	64.3	7.3
2001	31.5	62.7	5.8	27.5	65.1	7.4
2002	30.6	63.3	6.1	26.4	65.9	7.7
2003	29.6	64.0	6.4	25.3	66.5	8.2
2004	28.8	64.6	6.6	24.4	67.0	8.6
2005	28.1	65.1	6.9	23.6	67.4	9.0
2006	27.4	65.5	7.1	22.9	67.7	9.4

Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

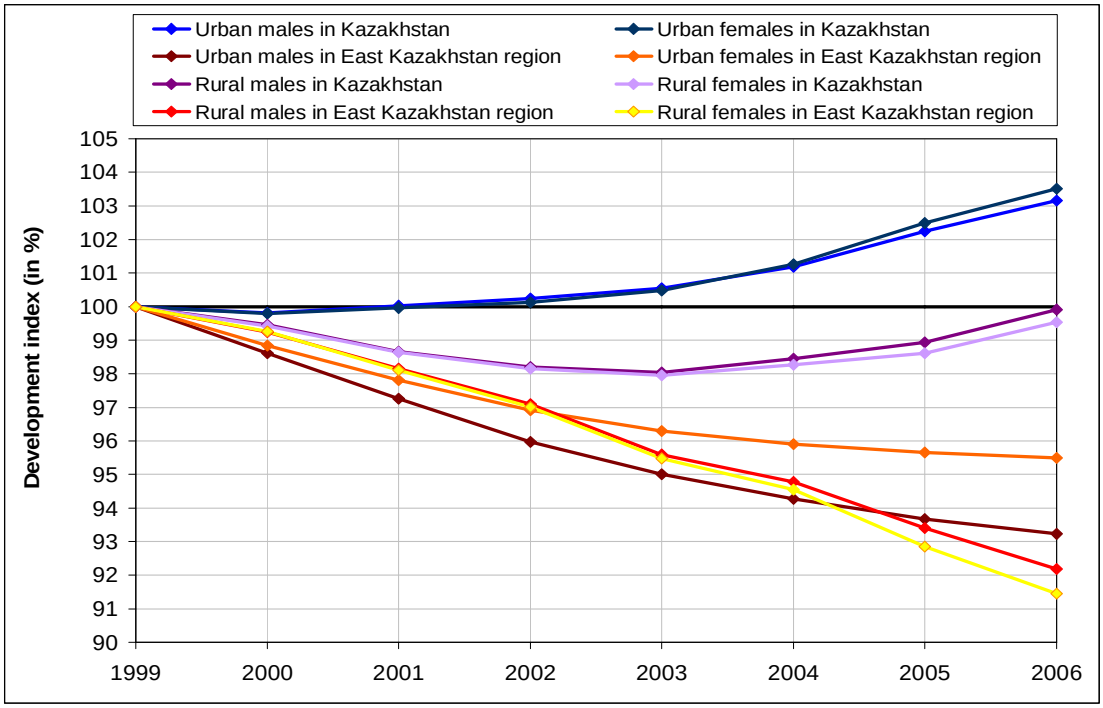
The distribution of population by main age groups in urban and rural settlements was the following: the proportion of children decreased from 25.3 per cent to 21.7 per cent in urban areas and from 33.1 per cent to 27.4 per cent in rural areas of Kazakhstan. In urban areas of Kazakhstan the proportions of working age population and people 65 years and over, they increased from 67.1 per cent in 1999 to 69.8 per cent in 2006 and from 7.5 per cent in 1999 to 8.4 per cent in 2006, respectively. In rural areas of Kazakhstan the increase of working age population was from 61.2 per cent in 1999 up to 65.5 per cent in 2006 and people older than 65 increased from 5.7 per cent in 1999 up to 7.1 per cent in 2006 (Tab. 7, Tab. 8).

In urban and rural areas in Kazakhstan and in the region trends of decreasing the number of children and increasing the number of older people and working age population were observed. In the urban and rural settlements of the region the proportion of children was lower, while, the proportion of working age population was higher than at the national level. Furthermore, in rural areas of the region the proportion of children reduced annually to 1 per cent point and population at age group 0-14 years declined from 29.3 per cent in 1999 to 22.9 per cent

in 2006. The proportion of children in rural areas was higher than in urban areas in Kazakhstan and in the region. In the region the increase of the proportion of working age population in urban settlements was 2.8 per cent point in 1999-2006 (from 68.4 per cent in 1999 up to 71.2 per cent in 2006). In rural areas of the region the proportion of working age population increased to 4.4 per cent point (from 63.3 per cent in 1999 to 67.7 per cent in 2006). The proportion of population in working age group in urban areas of the East Kazakhstan region and Kazakhstan was higher than the proportion of population of the same age group in rural areas.

The proportion of people older than 65 years old in urban areas of the region increased from 9.7 per cent in 1999 up to 11.1 per cent in 2006, while in rural areas of the region − from 7.4 per cent in 1999 up to 9.4 per cent in 2006. In Kazakhstan this proportion increased from 7.5 per cent in 1999 up to 8.4 per cent in 2006 in urban settlements. In rural areas it increased from 5.7 per cent in 1999 up to 7.1 per cent in 2006 (Tab. 7, Tab. 8).

Fig. 11: Population development by sex and type of settlements, Kazakhstan and East Kazakhstan region, 1999-2006 (1999=100 %)



Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

The development of population according to the type of settlements by sex was the following: urban males and females in Kazakhstan increased to 3.2 per cent and 3.5 per cent in 1999-2006. In 2006 the population of both sexes in rural areas was nearly at level of the population in 1999, while in the region the population continued to decline. For instance, in 1999-2008 the number of males and females of urban areas declined to 6.8 per cent and 4.5 per cent respectively. In comparison with urban areas, the population of rural areas declined more than one and half times for both sexes: namely, in rural areas the decline was to 7.8 per cent for males and for

females − to 8.6 per cent. The number of males in urban areas declined a little more than the number of females, to 0.3 per cent (Fig. 11.). The phenomenon that the females in rural area decreased more than the males could be a result of negative net migration of females from rural areas to urban ones, while the population of both sexes of urban areas decreased due to excess of male mortality after the age of 50 years old and international and interregional migration of both sexes. For instance, the sex ratio of population in rural and urban settlements showed that the proportion of males after the age group 50 years and over in urban areas decreased larger than in rural areas and disproportion of males in urban areas was at younger ages than in rural areas, which could be also a result of premature and excess males' mortality (Tab. 9).

The sex ratio in urban and rural areas was following: In Kazakhstan the prevalence of females over males in urban areas began from age group 15-19 years, while in rural areas – from age group 45-49 years in 1999. For age group 15-19 years it could be a reason of migration, and they migrated mostly with their parents who were usually in age group 45-49 years. In urban areas of Kazakhstan the prevalence of females over males shifted to the next age group 20-24 years in 2003. We suppose that it was a reason of males' mortality as well as females' migration since in urban areas mortality in age group of 20-24 years (especially for males) increases in comparison with previous age group. Also, usually in this age group young people (mostly females) moved to the cities by educational reason, therefore they increased the proportion of females in this age group in urban areas, respectively in rural areas the proportion of males in corresponding age group increased. For instance, in 2003 95 males per 100 females lived in urban areas, while in the same year 113 males per 100 females lived in rural areas. However, in 2006 the male and female shares in each particular age group in urban and rural settlements did not change. There was a decrease of males' proportion in urban and rural areas by each age category at the time of observation. For example, in urban and rural areas the prevalence of females over males was 27 and 25 males respectively per 100 females in 1999, 27 and 23 males per 100 females in 2003, and 29 and 25 males per 100 females in 2006 (Tab. 9).

In urban areas predominance of females' proportion over males' was from age group 15-19 years in 1999, 2003, and 2006. As it is mentioned above, the difference of sex ratio between rural and urban residents is explained by the fact that in urban areas males' mortality at the age of 15 and older was increasing dramatically because the age group is at risk. The most common causes of deaths were road traffic accidents, accident cases, and so on. In rural areas mortality of males was caused by diseases, but it is applied to older age groups, since the economic orientation of rural areas is not as dangerous as in urban areas, also ecological and environmental situation in rural areas is better than in urban areas (Sheriyazdanova, 2004:326-334). Also migration played a very important role in formation of population distribution by sex in corresponding age groups, increase of females in age group 15-19 years is explained by the fact that females moved from rural to urban areas for educational and searching job reasons (Tab. 9).

Tab. 9: Sex ratio by age according to type of settlements, Kazakhstan and East Kazakhstan region, 1999, 2003, and 2006 (male share per 100 females)

Age	Kazakhstan						East Kazakhstan region					
	1999		2003		2006		1999		2003		2006	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
0	108	105	105	103	106	105	101	106	101	106	102	106
1-4	104	104	106	105	105	105	103	104	103	104	105	106
5-9	104	104	104	104	106	105	102	106	102	106	103	104
10-14	103	103	103	104	104	104	103	104	103	104	102	105
15-19	97	110	102	104	101	105	95	114	95	114	99	111
20-24	92	112	95	113	98	108	92	120	92	120	95	115
25-29	92	110	91	112	92	114	95	112	95	112	89	125
30-34	90	107	90	110	89	111	91	108	91	108	90	114
35-39	90	103	89	105	88	108	90	107	90	107	88	110
40-44	87	100	87	101	86	102	88	101	88	101	85	103
45-49	84	94	84	96	84	98	87	97	87	97	82	101
50-54	82	91	80	91	78	92	82	93	82	93	78	94
55-59	74	85	76	87	74	87	76	86	76	86	74	88
60-64	74	87	66	80	65	79	72	85	72	85	65	80
65-69	66	78	65	80	60	75	63	77	63	77	60	73
70-74	50	58	54	66	55	69	50	57	50	57	51	67
75-79	37	42	41	47	44	55	33	40	33	40	42	53
80-84	32	34	33	35	33	36	29	33	29	33	30	36
85+	27	25	27	23	29	25	26	25	26	25	26	24

Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

8.3 Districts level

The analysis of the development of population at the level of districts was the following: The tendency of population decline was not observed in all administrative-territorial units. In 1999-2008 the population was increasing in Semey city (up to 5.1 per cent) and Kurchatov city (15.5 per cent) which is the result of international and internal migration, mostly. It was because these two cities were the supporting places for oralmans and the probability of finding a job was higher in these cities than in other cities of the region. In the past Semey city was the administrative centre of Semipalatinsk region which was included into the East Kazakhstan region according to the administrative-territorial division in 1997. Nowadays Semey city is a well developed, cultural and financial center of the region and one of the centers of influx of migrants.

The highest decline of the population was in Zharminsky district to 18.8 per cent, and the lowest one was in Zaysansky district and amounted to 1.3 per cent. Five districts were above the regional level of population change: Kurchatov, Semey, Ust-Kamenogorsk cities, and Zaysansky and Glubokovsky districts. In other districts the population change was higher than at the regional level (Ridder city, Ulansky, Tarbagataysky, Ayagozsky, Abaysky, Urdzharsky, Zyryanovsky, Shemonaikhinsky, Katon-Karagaisky, Kurchumsky, Beskaragaysky, Kokpektinsky, Borodulihinsky, Zharminsky districts) (Tab. 10). Excluding the two above mentioned administrative units, the population decline was observed in all districts.

Tab. 10: Population development at the level of districts, East Kazakhstan region, 1999-2008

Districts	Population in 1999 (in thousand)	Population in 2008 (in thousand)	Change (%)
East Kazakhstan region	**1532.9**	**1417.8**	**-7.5**
Kurchatov city	9.3	10.7	15.5
Semey city	298.3	313.5	5.1
Zaysansky	39.6	39.0	-1.3
Glubokovsky	67.3	65.4	-2.9
Ust-Kamenogorsk city	320.6	298.9	-6.8
Ulansky	45.9	42.4	-7.7
Ayagozsky*	82.0	74.6	-9.0
Ridder city	65.0	58.7	-9.7
Zyryanovsky*	93.9	84.2	-10.4
Tarbagataysky	65.7	58.3	-11.2
Abaysky	17.9	15.7	-12.5
Urdzharsky	95.5	82.3	-13.9
Katon-Karagaisky	45.2	38.1	-15.6
Shemonaikhinsky	58.0	48.9	-15.6
Kurchumsky	45.1	37.6	-16.7
Beskaragaysky	28.1	23.4	-16.9
Kokpektinsky	45.9	38.0	-17.1
Borodulihinsky	49.2	40.1	-18.4
Zharminsky	60.4	49.1	-18.8

Note: *Including Ayagoz city
*Including Zyryanovsk city

Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

The change of the population size by sex at the level of districts showed that in Glubokovsky and Zaysansky districts and in Semey, Kurchatov cities the level of change for males was below the regional one. The highest and lowest decline of males' population was observed in Zharminsky district (19.2 per cent point) and Zaysansky district (2.8 per cent point). The highest and lowest decline of females' population was observed in Zharminsky district (19.1 per cent point) and Glubokovsky district (2.6 per cent point). Only in Semey and Kurchatov cities a positive population change of both sexes was observed. In Semey city females' change was 8.0 per cent point lower than males' growth, while, in Kurchatov city females' change was 2.6 per cent point higher than males' growth. In Katon-Karagaisky district the population change rate for males and females was equal (14.4 per cent). In Abaysky (0.8 per cent point), Borodulihinsky (1 per cent point), Zaysansky (1.3 per cent point), Kokpektinsky (1.4 per cent point), Kurchumsky (0.8 per cent point), and Ulansky (1.2 per cent point) districts the level of change for females was higher than for males. In other districts the population change rate for males was higher (Tab. 11).

Tab. 11: Population development by sex at the level of districts, East Kazakhstan region, 1999-2008

Districts	Population in 1999 (thousand)		Population in 2008 (thousand)		Change (%)	
	Males	Females	Males	Females	Males	Females
East Kazakhstan region	**732.9**	**800.0**	**672.0**	**745.4**	-8.3	-6.8
Ust-Kamenogorsk city	146.9	173.8	133.9	164.2	-8.8	-5.5
Semey city	137.2	161.0	140.8	169.4	2.6	5.2
Ridder city	30.0	35.0	27.1	32.2	-9.7	-8.1
Kurchatov city	4.4	4.9	5.2	5.4	17.8	9.8
Abaysky	9.0	8.9	8.0	7.9	-11.3	-12.1
Ayagozsky*	40.8	41.2	37.1	37.6	-9.2	-8.8
Beskaragaysky	13.8	14.4	11.6	12.2	-15.7	-15.5
Borodulihinsky	24.5	24.7	20.5	20.4	-16.4	-17.4
Glubokovsky	32.3	35.1	31.3	34.2	-3.0	-2.6
Zharminsky	30.1	30.4	24.3	24.6	-19.2	-19.1
Zaysansky	19.8	19.8	19.2	19.0	-2.8	-4.1
Zyryanovsky*	44.1	49.8	39.2	44.9	-11.1	-9.8
Kokpektinsky	22.9	23.0	19.4	19.1	-15.3	-16.7
Kurchumsky	22.7	22.4	19.3	19.0	-14.8	-15.6
Katon-Karagaisky	22.7	22.5	19.4	19.2	-14.4	-14.4
Ulansky	33.7	32.0	30.5	28.5	-9.6	-10.8
Urdzharsky	22.4	23.5	19.9	20.9	-11.4	-10.9
Shemonaikhinsky	48.0	47.5	41.7	40.9	-13.1	-13.9

Note: *Including Ayagoz city
*Including Zyryanovsk city

Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

The sex ratio by districts showed that the prevalence of males over females was not observed in all the districts. During the considered period in the East Kazakhstan region the sex ratio was 90 males per 100 females. Among the districts the sex ratio was the following: in 1999 the highest proportion of males was observed in Kurchatov city: 158 males per 100 females, then the proportion of males in this city decreased year by year and in 2008 the sex ratio was 98 males per 100 females. However, in Ridder city and in Shemonaikhinsky district the proportion of males increased. The sex ratio in these districts was 93 and 78 males per 100 females in 1999 and in 2008 it was 115 and 107 males per 100 females, respectively. The sex ratio among the districts with 100 per cent of rural population showed that excluding Beskaragaysky, Kurchumsky, and Katon-Karagaisky districts, the sex ratio decreased. For example, if in 1999 in Abaysky, Kokpektinsky and Kokpektinsky districts the sex ratio was 116, 107, and 112 males per 100 females, and then in 2008 it was 109, 100, and 106 males per 100 females, correspondingly. It should be noted that in Beskaragaysky district the proportion of males was lower than of females in 1999, and then in 2008 it was 108 males per 100 females. This increase was observed in Kurchumsky and Katon-Karagaisky districts too. The sex ratio in the districts with mixed urban and rural settlements where rural population is more prevalent (more than 50 per cent) showed that in Zyryanovsky and in Ulansky districts the proportion of males was lower than the proportion of females. In these districts it was 95 and 94 males per 100 females in 2008 respectively. In other districts the females' proportion was lower than males' one. The sex ratio in

Ust-Kamenogorsk city was 103 males per 100 females in 1999 and 104 males per 100 females in 2008 and the highest proportion of males was observed in 2001: 110 males per 100 females. In Semey city in 1999 the proportion of males was lower than the proportion of females and the sex ratio was 96 males per 100 females, whereas, in 2008 the sex ratio was 104 males per 100 females.

Tab. 12: Sex ratio by districts, East Kazakhstan region, 1999-2008(male share per 100 females)

Districts	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
East Kazakhstan region	**91**	**90**	**90**	**90**	**90**	**90**	**90**	**90**	**90**	**90**
Ust-Kamenogorsk city	103	109	110	94	103	105	102	106	105	104
Semey city	96	113	106	107	107	106	103	99	103	104
Ridder city	93	94	137	94	92	105	121	103	119	115
Kurchatov city	158	95	135	133	75	136	94	71	103	98
Abaysky	116	81	99	99	110	83	111	114	91	109
Ayagozsky	110	105	93	101	116	105	106	105	109	113
Beskaragaysky	93	107	112	98	87	97	103	114	86	111
Borodulihinsky	120	114	103	117	124	102	91	99	104	111
Glubokovsky	113	102	104	121	100	122	112	108	89	103
Zharminsky	109	105	104	113	91	122	107	103	108	100
Zaysansky	103	106	110	113	109	97	131	116	111	112
Zyryanovsky	105	110	89	97	94	86	100	119	91	95
Kokpektinsky	107	92	100	90	109	130	103	112	110	100
Kurchumsky	100	119	110	94	91	109	105	117	96	112
Katon-Karagaisky	103	123	101	101	108	109	101	98	102	107
Tarbagataysky	98	100	119	108	109	112	107	107	117	103
Ulansky	126	114	103	101	107	91	123	104	117	94
Urdzharsky	112	105	108	109	101	113	112	102	101	106
Shemonaikhinsky	78	115	98	112	109	129	110	88	102	107

Source: Author's calculation based on data from the Agency of Statistics of the Republic of Kazakhstan

At the level of districts we observed that in all districts of the region the proportion of children declined and the proportion of working age population and people older than 65 increased. The highest decline of the children proportion was observed in Tarbagataysky and Kokpektinsky districts, where in 1999 was one of the highest proportions of children.

At the level of districts the development of main age groups by sex was the following: prevalence of males over females was observed in age groups of children and in working age population. Females twice prevailed over males in the age group of people older than 65. It was observed in all districts. In the place with 100 per cent of urban population (Kurchatov city) 25.6 per cent of population was concentrated in age group 0-14 years (27.8 per cent of males and 23.6 per cent of females) in 1999 and 20.9 per cent (21.9 per cent of males and 19.9 per cent of females) in 2008. In the place with 100 per cent of rural population the highest proportion in age group of children was in Abaysky district 27.8 per cent (27.8 per cent of males and 29.6 per cent of females), and the lowest one is 22.0 per cent in Beskaragaysky district (22.2 per cent of males and 21.8 per cent of females) in 1999. In 2006 the highest value was in Abaysky district and the lowest one was in Kokpektinsky district but in different value (Tab. 13, Tab. 14).

Among the mixed places with prevailing number of urban population the proportion of children in Shemonaikhinsky district was 23.5 per cent (25.7 per cent of males and 21.7 per cent of females) in 1999 and 19.1 per cent (21.3 per cent of males and 17.3 per cent of females), in Ridder city 19.7 per cent (21.6 per cent of males and 18.0 per cent of females) in 1999 and 15.6 per cent (17.2 per cent of males and 14.2 per cent of females) in 2006 (Tab. 13, Tab. 14).

Among the mixed places with prevalence of rural population the highest proportion of children was 34.9 per cent (35.0 per cent of males and 34.7 per cent of females) in Tarbagataysky district, the lowest proportion of children was in Glubokovsky district - 20.1 per cent (21.6 per cent of males and 18.8 per cent of females) in 1999 and in 2008 the highest share was in Ayagozsky district, the lowest one was in Glubokovsky (Tab. 13, Tab. 14).

The proportion of children in Ust-Kamenogorsk city was 19.2 per cent (21.3 per cent of males 17.4 per cent females) in 1999 and 14.7 per cent (16.5 per cent of males 13.1 per cent of females) in 2008, and in Semey it was 23.5 per cent (25.7 per cent of males 21.7 per cent of females) in 1999. In 2008 the percentage ratio in this age group decreased approximately to 4 per cent point in Semey city. Such difference in the distribution of this age group was explained by the level of natality in these districts. The decrease of the proportion of children was connected not only with the decline of natality, but also with high level of out-migration (Tab. 13, Tab. 14).

In 1999-2008 the proportion of working age group increased in all districts of the region. It was explained by the fact that the baby-boom generation of the 1980s entered into the working age group and oralman-Kazakhs immigrated. If the increase of the children's proportion in the age structure of the population depends not only on the level of migration but also on the level of natality, the share of working age population and people older than 65 can be increased only under the influence of migration and transition of people by age cohorts. The highest increase of the working age population was in Tarbagataysky district (to 6.3 per cent point) and the lowest increase was in Ust-Kamenogorsk city and Abaysky district (to 2.0 per cent point) in 1999-2008 (Tab. 13, Tab. 14).

The proportion of older people (age group 65 years and over) increased in all districts. As the United Nations note in their reports, if in the population age and sex structure the proportion of older people is more than 7 per cent, then we can say that the process of population ageing takes place in this population (United Nations, 2002). From this we can conclude that in most districts excluding Tarbagataysky, Urdzharsky, Ayagozsky, and Zharminsky districts the proportion of older people was more than seven per cent. This means that population ageing process was going on among the most districts of the region and in total it gave a population ageing in the whole East Kazakhstan region. Also it should be noted that the highest increase of proportion of people older than 65 was observed in the districts where in 1999 was one of the highest proportions of children. For instance, in Abaysky district the increase of the people older than 65 was up to 3.5 per cent point, in Beskaragaysky district − up to 3.2 per cent point in 1999-2008 (Tab. 13, Tab. 14).

From the distribution of the population by main age groups we can conclude that in the districts with 100 per cent of rural population or in the districts with prevalence of rural population more than 50 per cent population age structure is young, while in the districts with prevalence of urban population excluding Semey city and Kurchatov city the population age structure is old. In other words we can conclude that in agricultural districts the population age structure is young and in industrial districts it is old.

Tab. 13: Population by main age groups at the level of districts, East Kazakhstan region, 1999, (in %)

Districts	0-14			15-64			65+		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
East Kazakhstan region	**26.6**	**23.5**	**24.9**	**67.3**	**65.4**	**66.4**	**6.1**	**11.1**	**8.7**
Ust-Kamenogorsk city	21.3	17.4	19.2	71.6	70.0	70.7	7.1	12.6	10.1
Semey city	25.7	21.7	23.5	69.0	68.2	68.5	5.3	10.2	7.9
Ridder city	21.6	18.0	19.7	70.0	65.9	67.8	8.3	16.1	12.5
Kurchatov city	27.8	23.6	25.6	69.5	70.0	69.8	2.7	6.4	4.6
Abaysky	34.2	34.2	34.2	63.2	60.9	62.1	2.6	4.8	3.7
Ayagozsky	32.9	33.1	33.0	64.2	61.7	63.0	2.9	5.2	4.0
Beskaragaysky	28.6	27.7	28.1	65.2	61.0	63.0	6.2	11.4	8.8
Borodulihinsky	25.4	23.7	24.6	68.8	65.1	67.0	5.8	11.2	8.5
Glubokovsky	21.6	18.8	20.1	68.4	63.6	65.9	10.0	17.7	14.0
Zharminsky	31.9	29.9	30.9	64.0	62.7	63.4	4.0	7.3	5.7
Zaysansky	33.9	33.2	33.6	61.2	59.5	60.3	5.0	7.3	6.1
Zyryanovsky	24.5	21.2	22.8	66.2	62.4	64.2	9.3	16.4	13.0
Kokpektinsky	31.2	28.2	29.7	63.5	61.3	62.4	5.4	10.6	8.0
Kurchumsky	31.2	29.9	30.5	64.0	61.4	62.7	4.7	8.7	6.7
Katon-Karagaisky	30.2	29.0	29.6	64.0	60.3	62.2	5.8	10.7	8.2
Tarbagataysky	35.0	34.7	34.9	61.6	59.5	60.6	3.4	5.7	4.5
Ulansky	27.2	24.6	25.9	66.3	64.0	65.1	6.6	11.4	9.0
Urdzharsky	31.3	30.6	31.0	64.2	62.6	63.4	4.4	6.8	5.6
Shemonaikhinsky	25.7	21.7	23.5	69.0	68.2	68.5	5.3	10.2	7.9

Source: Data on the Agency of Statistics of the Republic of Kazakhstan

Tab. 14: Population by main age groups at the level of districts, East Kazakhstan region, 2008, (in %)

Districts	0-14			15-64			65+		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
East Kazakhstan region	**21.0**	**18.1**	**19.4**	**71.4**	**68.8**	**70.3**	**7.6**	**13.1**	**10.3**
Ust-Kamenogorsk city	16.5	13.1	14.7	74.2	71.5	72.7	9.3	15.3	12.6
Semey city	21.3	17.3	19.1	72.2	71.6	71.9	6.5	11.1	9.0
Ridder city	17.2	14.2	15.6	73.7	68.3	70.8	9.1	17.5	13.6
Kurchatov city	21.9	19.9	20.9	74.6	71.7	73.1	3.5	8.5	6.0
Abaysky	27.8	29.6	28.7	66.4	61.8	64.1	5.9	8.5	7.2
Ayagozsky	26.8	28.0	27.4	68.4	64.3	66.4	4.8	7.7	6.2
Beskaragaysky	22.2	21.8	22.0	69.0	63.1	66.0	8.7	15.1	12.0
Borodulihinsky	19.4	18.4	18.9	73.3	68.0	70.7	7.3	13.6	10.4
Glubokovsky	16.8	14.4	15.5	72.5	67.2	69.7	10.7	18.4	14.7
Zharminsky	25.7	24.2	25.0	68.2	65.6	66.9	6.1	10.2	8.1
Zaysansky	27.6	26.4	27.0	66.5	64.6	65.6	5.9	8.9	7.4
Zyryanovsky	17.8	15.9	16.8	71.1	65.8	68.4	11.1	18.3	14.9
Kokpektinsky	22.6	21.1	21.8	70.6	66.6	68.6	6.9	12.3	9.6
Kurchumsky	24.8	23.4	24.2	69.0	66.4	67.7	6.1	10.2	8.2
Katon-Karagaisky	23.8	22.3	23.0	69.5	65.7	67.6	6.7	12.0	9.4
Tarbagataysky	26.9	27.2	27.0	68.4	65.4	66.9	4.7	7.5	6.0
Ulansky	19.9	18.3	19.1	71.5	68.0	69.7	8.6	13.7	11.2
Urdzharsky	26.6	25.7	26.2	67.7	65.3	66.5	5.7	9.0	7.3
Shemonaikhinsky	21.3	17.3	19.1	72.2	71.6	71.9	6.5	11.1	9.0

Source: Data on the Agency of Statistics of the Republic of Kazakhstan

9 The role of migration in population size and age-sex structure development in the East Kazakhstan region and its subdivisions

This chapter of the study focuses on the analysis of the impact of natural and migratory changes on development of the population size and the influence of migration and mortality on development of the population age and sex structure in the region and its urban and rural settlements and districts.

9.1 Regional level

As we noted above, the components of population change are natural change and net migration. Usually, the level of natural change is formed by long-term acting factors, changes little by little. Another source of population change in particular regions or a country is migration. The impact of migration on the change of population size is distinctive. For all well-known stability of the size of in-migration and out-migration the net migration can change throughout several years in different directions (from negative to positive) (Rybakovsky, 2001:111-112). These changes in the values of natural change and net migration have influence on the population development. Migration changes not only population size, age and structure, but also it is one of the fundamental components of forming population ethnic composition, especially in the East Kazakhstan region (Tarasova, 2004).

The intensity of migration in the region depends on population ethnic composition. The ethnic structure of migrants showed that the region lost European ethnic groups (the Russians, the Germans, and the Ukrainians) in international migration, while, losses of internal migration flows were formed by negative net migration of Kazakhs. The outflow of European ethnic groups from cities was going on side by side with crisis of social infrastructure in rural settlements and it makes rural population move to urban settlements. The result of this was increasing proportion of Kazakhs in urban settlements (Tarasova, 2005:139-140).

Taking the above mentioned into consideration we can assume that in the region there were mixed stages of mobility transition model. The mixed stages consisted of the second, the

third, and the fourth phases, where we can observe mass rural-urban migration, increasing urbanization level, and urban-urban migration from small and medium cities to big cities (Zelinsky, 1971).

At the beginning of the 21st century we can observe such trends as decrease of emigration and increase of immigration. The increase of immigration was due to oralmans, the decrease of emigration can be explained as a reduction of the capacity of emigration. Most of the emigrants called their motivation for emigration "return to Historical Motherland". However, no one could identify what is "Historical Motherland" (Alekseenko, 2002:177-188). In this case we assume that it was just migration with economic motivation − stabilization of economic situation in the country, improvement of well-being of the people and sale of real and movable property by paying high price gave a chance to use postponed movement.

In the period of rapid economic growth internal migration began to be more intensive than international migration. Flows of internal migrants began to exceed the flows of international migrants. People moved from rural to urban areas and the population of regional and national centers began to increase. At the national level, people migrated to Astana and Almaty cities, West Kazakhstan for searching work and welfare.

As it was noted in chapter 8.1, the population of the East Kazakhstan region declined to 7.5 per cent in 1999-2008. The current reproduction pattern formulated by low level of natality and high level of mortality, especially excess males' mortality, could not prove the role of natural growth in the region (Sheriyazdanova, 2004:326-334). The major influence on the decline of population was due to migration. In the East Kazakhstan region natural change of population altered from negative to positive value since 2004, but net migration was negative during the issued time. The value of net migration declined approximately three times from 14.5 thousand in 1999 to 5.3 thousand in 2008. In comparison with 2007 in 2008 the net migration declined twice. At the same time natural change twice increased. Reduction of the population size in the East Kazakhstan region was in average to 1 per cent point annually in 1999-2005, only from 2006 to 2008 population declined to 0.5 per cent point annually, which was caused by the increase of natural change and the decrease of net migration. Net migration decreased from 14.5 thousand in 1999 to 5.3 thousand in 2008, but it was still a negative value. In 2003 such fluctuation as decrease of net migration was observed. Total population change was positive in 2008 (Tab. 15).

Tab. 15: Population development by natural and migration change, East Kazakhstan region, 1999-2008

	Population as January 1 (thousand)	Population change (thousand)	Natural change (thousand)	Net migration (thousand)	Population as December 31 (thousand)	Total change (%)
1999	1,533	-16.2	-1.7	-14.5	1,517	-1.1
2000	1,517	-17.7	-1.8	-15.9	1,499	-1.2
2001	1,499	-16.5	-1.8	-14.8	1,483	-1.1
2002	1,483	-16.6	-1.1	-15.5	1,466	-1.1
2003	1,466	-10.5	-0.4	-10.2	1,455	-0.7
2004	1,455	-13.3	1.0	-14.3	1,442	-0.9
2005	1,442	-10.9	0.6	-11.5	1,431	-0.8

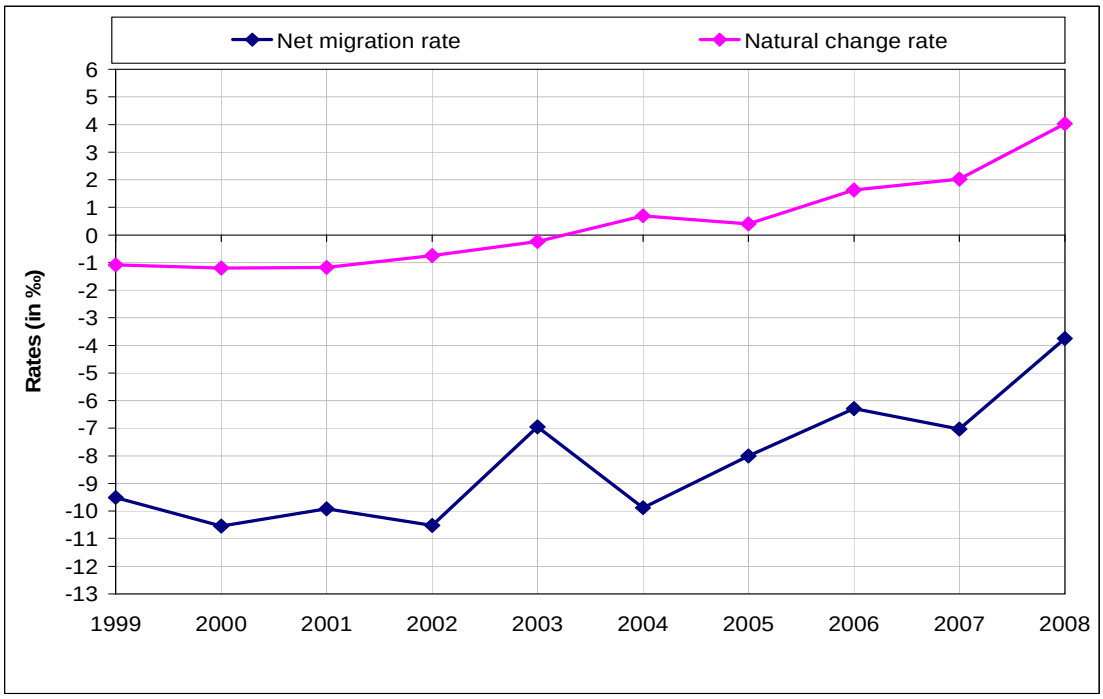
Tab. 15: continued (and also repeat table's header)

2006	1,431	-6.7	2.3	-9.0	1,425	-0.5
2007	1,425	-7.1	2.9	-10.0	1,417	-0.5
2008	1,417	0.4	5.7	-5.3	1,418	0.0

Source: Author's calculation based on data of Agency on Statistics of Republic of Kazakhstan

We assume that changes in natural and migration change of population in 2008 were a start of a new trend in the population development or one-year fluctuation. This fluctuation could be a reason of economic crisis which began in 2008. Staff reduction at crisis time made women stay at home, and at this time she had an opportunity to realize her postponed pregnancy. In addition, maternity and child benefit can solve financial problems of the family and women, since the child benefit rises till 250 dollars (http://mirtv.ru/content/view/21826/62/). If the level of natural change exceeds the level of net migration, then in the future the natural change will play a basic role in the population development in the region. However, in the current period migration plays a more important role in the population development than natural change in the region.

Fig. 12: Population development by migration and natural change, East Kazakhstan region, 1999-2008

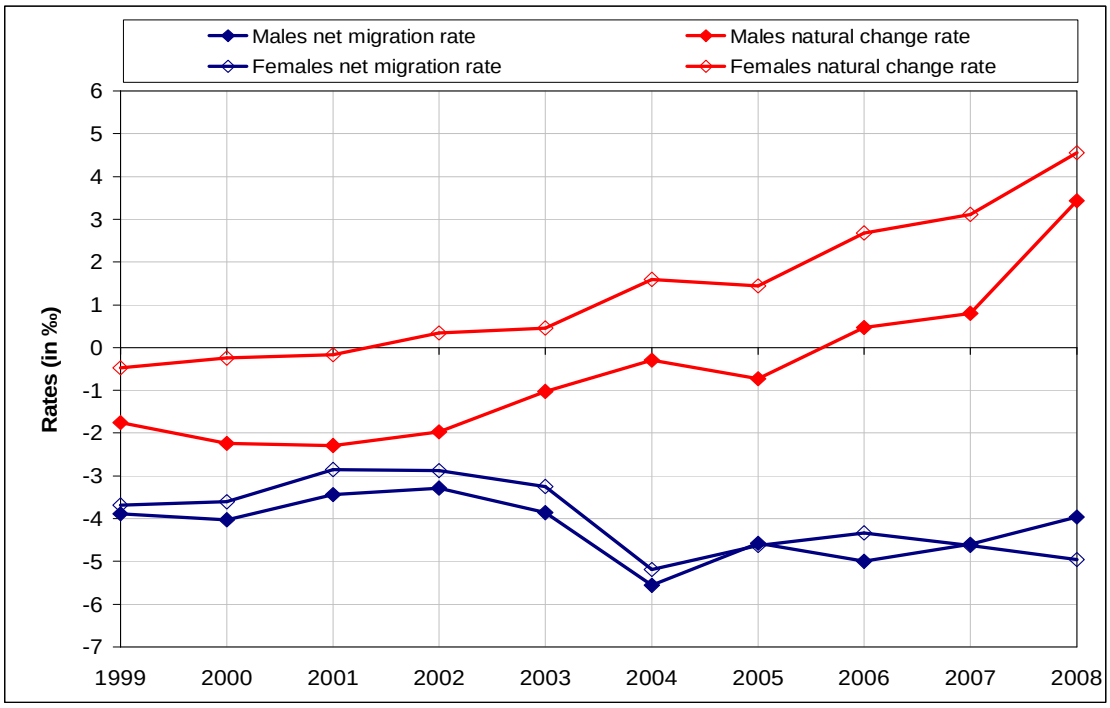


Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

As it was mentioned above, the population in the East Kazakhstan region declined in spite of the fact that natural change rate has been positive since 2004. From the Figure 12 it was obvious that the net migration rate was approximately 10 times higher than the natural change rate, which means that demographic development in the region was mainly due to migration influence. For instance, in the region net migration rate was nine times higher than natural change rate in 1999 and 2000, eight times in 2001, fourteen times in 2002 and 2004, twenty nine

times in 2003, twenty times in 2005. For example, if in 2005 net migration rate was 8.0 per mile to 0.2 per mile of natural change, then it was 6.1 per mile to 1.9 per mile respectively in 2006 (Fig. 12).

Fig. 13: Population development by migration and natural change according to sex, East Kazakhstan region, 1999-2008



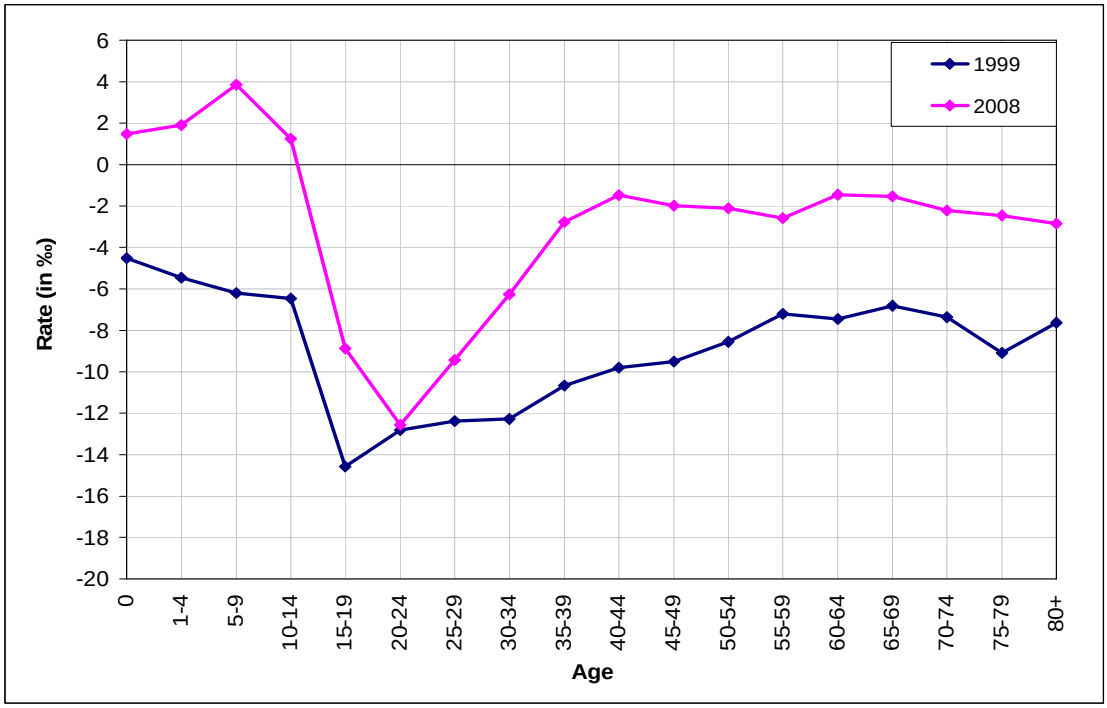
Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

In this study we mentioned several times that in the region males' mortality exceeds females' one. We see from Figure 13 that males' natural change rate was higher than females' one in average to 2 per mile in 1999-2008. Females' natural change rate began to be positive earlier than males' natural change (since 2002), while males' one was positive since 2006. For both sexes influence of migration on population development was higher than impact of natural change. In 1999-2004 the trend was that males migrated more than females and the intensity of females' migration was lower than males' one to 1 per mile. Since 2005 migration intensity of both sexes fluctuated: in 2005 females' net migration intensity was the same as males' one (4.6 per mile). Then in 2006 males' net migration rate was higher than females' one to 0.7 per mile. In 2007 they were equal again and in 2008 females' net migration rate was higher than males' one to 1 per mile. The highest influence of migration on males' population development was in 2004, when net migration rate was 18 times higher than natural change rate. For females' population the highest migration impact on population development was in 2001, when net migration rate was 17 times higher than natural change rate (Fig. 13).

In connection with the increasing intensity of females' migration in the region we assumed that there is a trend called "feminization of migration". This trend is going on in the whole world, especially in international migration. 'Significantly, many of the new female

migrants relocate as principal wage earners, rather than as accompanying family members. Many of today's migration streams began with the recruitment and employment of foreign workers' (Martin, 2005:2). Hypothetically, this trend appeared due to changes of the position of females in political and economical life of the states. "Feminization of migration" could be a reason of free access to information and globalization. It is an urgent question for developing countries too. It may also be the result of changing attitudes of young people to traditions which is typical for Kazakhs. Kazakh women became far from tradition and traditional thinking. The aspirations of women for development, education, professional growth have influence on their migratory behavior. Also the ecological situation in the region can be a cause of activation of out-migration of females. Probably, females want to have healthy posterity.

Fig. 14: Age structure of net migration, East Kazakhstan region, 1999 and 2008



Source*:* Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

In the normal social-economic and political conditions the life circle of the population is subject to two age migration "peaks". The population at the age of 15-29 has the greatest migration activity. Besides, in the countries with well-developed economy migration increases in older age groups – it is migration to the regions with especially comfortable climatic, social conditions; in developing countries – to the grown-up children, living in other places, etc. In general, the age structure of migrants is characterized by much greater proportion of the working age population, namely of 15-44 years old (Karachurina, 2007:245-246).

In 1999-2008 the general trend in developing the intensity of migration by age was increasing migration intensity from age group of children, excluding newborns, till age group 20-24 years. From age group 25-29 years the intensity of migration began to decrease by

every age group. It should be noted, the change of migration intensity in age group of children depends on the development of migration intensity of their parents who are usually in the age group 25-50 years (Fig. 14).

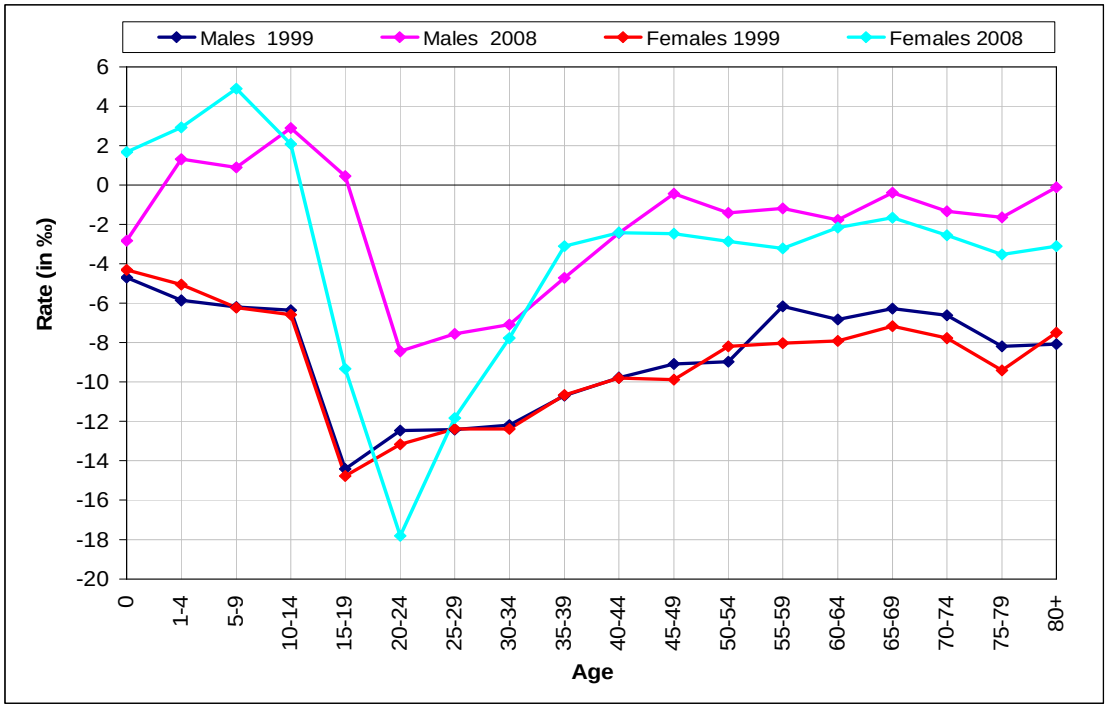
In 1999 and 2008 the highest migration intensity was observed in age groups 15-19 and 20-24 years, respectively. This shifting was due to the distribution of population by age structure. It means that in 1999 generation of the first half of the 1980s was aged 15-19 years. In the same age group was generation of the 1990s in 2008. The generation of 1990s is known for their small proportion in age structure of the population, because at the end of the 1980s and beginning of the 1990s the natality in the East Kazakhstan region as a whole as well as in Kazakhstan sharply decreased. In 2008 in the age group 20-24 years there was a generation of the second half of the 1980s. They have the big proportion in the age structure of population. Regarding to their size generation of the 1980s had higher migration intensity than generation of the 1990s which is the age group 15-19 years in 2008. If we keeping in mind that the intensity of migration by age decreases, then age group 25-29 years had lower migration intensity than age group 20-24 years. It led to the fact that in 2008 the highest migration intensity was in age group 20-24.

In 1999 the decrease of migration intensity by age stopped in age group 50-54 years and stabilized in age groups from 55-59 years to 70-74 years approximately at the level 7 per mile. In the age group 75-79 years rapid intensity increase up to 2 per mile was observed too. In the age group 80 years and over it decreased to 1 per mile in 1999. However, in 2008 the age of stabilization of migratory activity shifted to younger ages (to age group 40-44 years) and in older population the intensity of migration was stable. Also from age group 20-24 years to age group 40-44 years the decrease of the intensity of migration was to 10 per mile in 2008, while in 1999 migration intensity was five times slower in the same age group. In age group 0-14 years the size of in-migrants was higher than out-migrants and net migration was positive in 2008 (Fig. 14).

As we noted above, males' and females' migration intensity are different, and this difference is showed in Figure 13. In 1999 males' and females' age-specific net migration rates were close to each other, it means that their age-specific intensity was equal almost till age group 40-44 years. From this age group the difference between age-sex specific migration intensity exists and increases age by age. For example, in age group 20-24 years the difference between sexes was 10 per mile, but the age group 40-44 years had no differences and at older ages (age group 65 years and over) in average it was 1 per mile. The excess males' mortality from age-group 40-44 could be a reason that the tendency of increasing sex-specific net migration difference by age takes a place. Since the proportion of males in the same age group decreased, age-specific males' migration decreased too. In older ages (60 years and over) the proportion of females in age structure of population exceeded the proportion of males that is why the intensity of females' net migration was higher than males'. In 2008 the difference in age-specific migration intensity by sex was fully presented. In 2008 migration intensity of females in age group 20-24 years was higher in comparison with the same age group of both

males and females in 1999. Nevertheless, the intensity of migration in this age group and the same age group of males was lower in comparison with males' and females' intensity of migration (Fig. 15). From this we see that migration breaks normal sex-age distribution of the population. Migration frequently results in the fact that young males gather in the definite places, but in the other places there is a considerable prevalence of females. Sex disproportions created by migration were observed by sex ratio (Tab.5, Tab.9).

Fig. 15: Age structure of net-migration by sex, East Kazakhstan region, 1999 and 2008



Source*:* Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

Concerning the impact of migration on the development of the population age structure we can say the following: In the regions of the mass departure the age structure of the population deteriorates due to the two processes –decrease of the size and proportion of the population at active migration ages and decrease of the number of the children who could be born from the people who have migrated (and who are at active reproductive age). In the regions of the mass arrival the situation is the contrary. Joining a new society, migrants fulfill a "rejuvenating" function. Besides, even if the migrants' reproductive attitude in the place of the previous residence does not differ from the reproductive standards, accepted in the new society, they positively contribute to natality owing to their high fertility intensity in young reproductive age groups. If the reproductive standards in the places of the previous and current residence differ, there is a kind of an "additional" contingent of the newborns for some time in the countries/regions of the new place of residence (Karachurina, 2007:245, 247.).

The age-specific net migration rate could not show the role of migration in development of population age structure by itself, since it included other components of population

development such as mortality and natality. As we mentioned in the concept of evaluating the role of migration in population development, natality or number of births was an initial number of newborns. From this the ratio between age-specific net migration and mortality rates presents the role of migration in development of particular age groups.

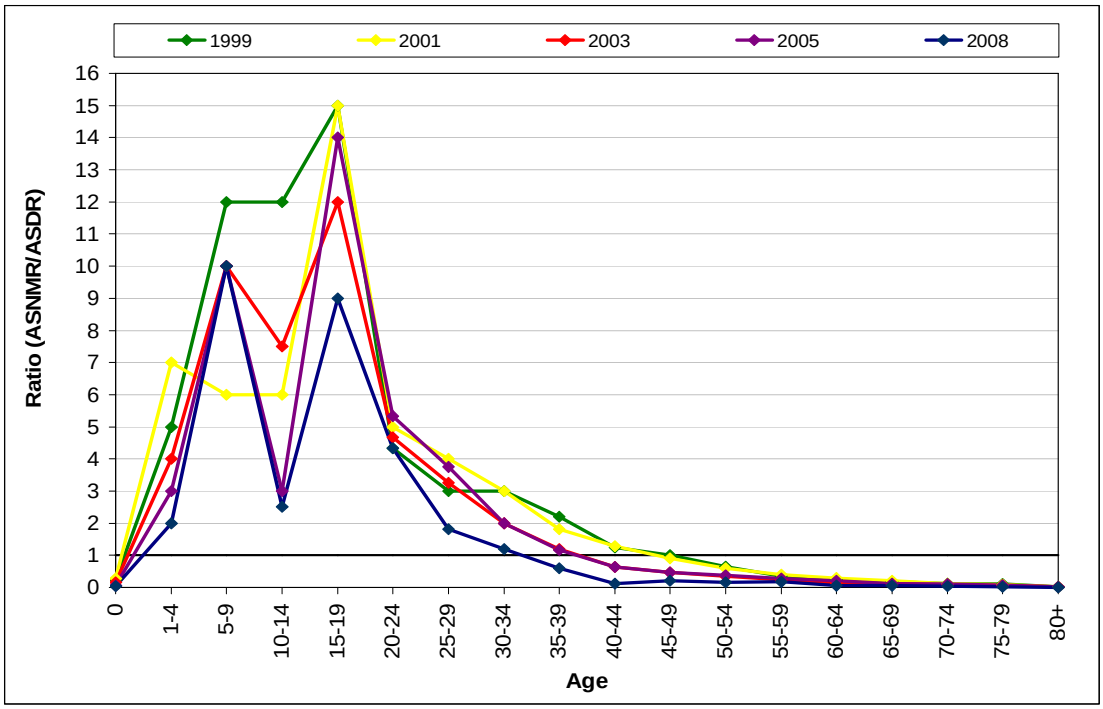
Usually mortality intensity among the newborns and older people is higher in comparison with other age groups. From this point of view infant mortality is the most important problem in healthcare system in the East Kazakhstan region as well as in Kazakhstan. The analysis of the ratio by five-year age groups showed that the influence of mortality on the change of newborn size was more significant than influence of migration in 1999-2008. For example, in age group of newborns mortality intensity was 4 times higher than migration in 1999, 3.5 times in 2001. Since 2003 the intensity of migration in age group zero decreased and the influence of mortality became stronger and in 2008 mortality intensity was 24 times higher than migration (Fig. 16).

In the next age group the level of mortality rapidly decreased (20 times) and migration appeared on the first place for building the age structure of population. Further the influence of migration on the formation of age groups became more entrenched. The highest incidence of migration is observed in young working age group (15-19, 20-24, 25-29 and 30-34 years). The intensity of mortality in age groups 5-9 years and 10-14 years was insignificant, since its value was very small (0.5 per mile in 1999, 0.4 per mile in 2003, 2005, 2008 and 1 per mile in 2001). In age groups 15-19 years and 20-24 years the intensity of mortality was stable (1 and 3 per miles), while net migration intensity changed in 1999-2008. For instance, if net migration rate of age groups 15-19 years and 20-24 years was 15 and 13 per mile respectively in 1999, then in 2003 it was 12 and 14 per miles and 9 and 13 per miles in 2008. At the same time the change of the death rate was observed, but not as great as net migration rate and that is why its influence on the proportion of the population in these age groups was not so substantial. In age group 25-29 years the intensity of net migration is three times higher than mortality intensity in 1999, 4 times in 2001, 3 times in 2003, 3.5 times in 2005 and less than two times in 2008. It clearly proved that the formation of age group 25-29 years was due to migration. The same situation as in age group 25-29 years was observed in age groups 30-34 and 30-39 years, the difference was only in values of net migration, the mortality was stable. However, in the age group 30-39 years net migration rate in 2008 decreased in comparison with the previous year, and mortality was identical with the previous year rates. It showed that in the last years of observation in age group 30-34 years mortality had higher influence than migration. It could be a one year fluctuation or a new trend. It was difficult to define, because the length of time is only one year (Fig. 16).

The impact of migration on population change is more instable than of mortality, since migration is a process which much more depends on social and economic development of the region and mortality depends mostly on health of population and development of health care system in the region (excluding, wars and epidemiology). In other words migration is a socio-demographic

process and mortality is a bio-demographic process. The changes in biological structure of population proceed harder and more slowly than in social structure. The changes of net migration intensity in age group 40-44 years showed that it decreased in 1999-2008. The decrease of the role of migration from this age group was observed from 2003, because intensity of migration decreased and mortality intensity did not change. In 1999 the influence of migration on the changes of age group 40-44 years was still significant. In 1999 for the next age group 45-49 years migration activity and influenced similar, because their ratio was 1, then since 2001 the intensity of migration in this age group began to decrease and in 2008 mortality intensity in age group 45-49 years was five times higher than migration intensity. From the age group 50-54 years and older migration decreased and mortality increased with high speed and the role of migration in population development in age group 50 years and over was not essential. It proved that migration was more volatile than mortality, especially at ages when migration intensity decreases (Fig. 16).

Fig. 16: The role of migration in population age structure development, East Kazakhstan region, 1999, 2001, 2003, 2005 and 2008



Source*:* Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

The development of mortality and migration intensity between sexes showed the following differences between them: The role of migration in development of particular age groups by sex depends on males' and females' migration intensity and mortality differentiation in these age groups. It should be noted that excluding age groups of newborns and people older than 65, the role of migration in development of females' age structure was higher than males' one, because the ratio for females was twice higher. The ratio between age-specific net migration

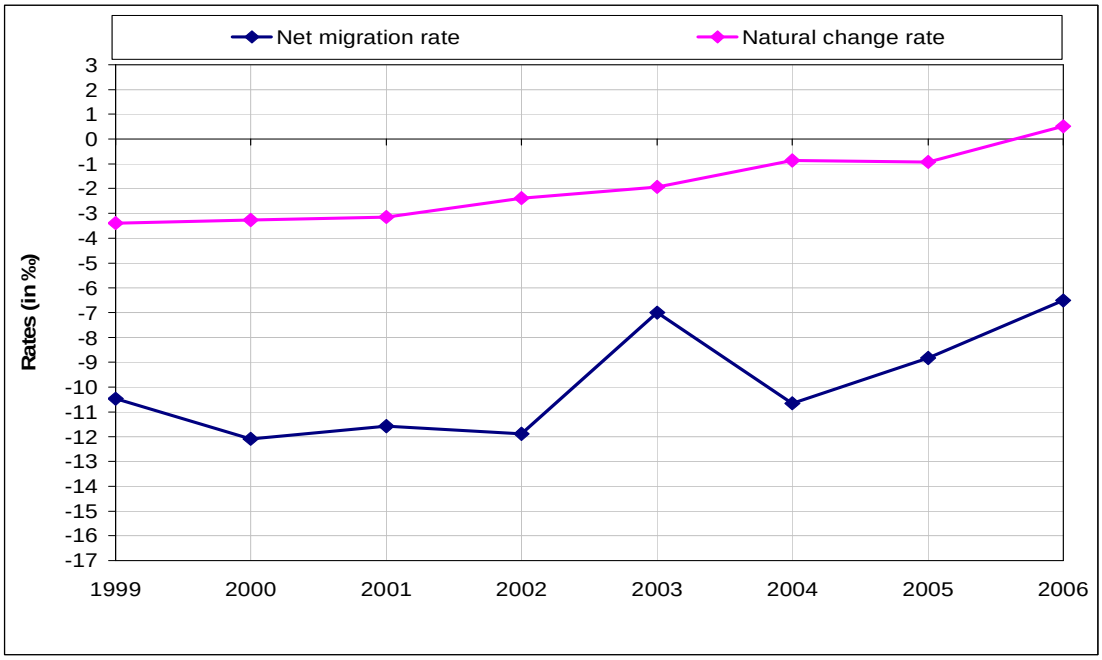
and mortality rates by sex showed that there was some fluctuation in the impact of migration on development of males' and females' age structures in 1999-2008: the most significant role of migration on population age structure was from age group 5-9 years to age group 35-99 years for females, while, for males it was from age group 5-9 years to age group 25-29 years. Since the level of mortality in age group 5-25 years did not change so much, then the change of the values of the ratio was forced by changes in migration intensity by age groups. From 2003 in age group 5-25 years males' migration intensity decreased, then the values of the ratio decreased too, which reduced the role of migration. For females it was quite the contrary: in these age groups the value of the ratio increased and the role of migration increased correspondingly. In 2008 the value of the ratio was equal to zero since this year there was no migration in this age group. For males the role of migration in development of particular age groups began to reduce from age group 30-34 years because the intensity of mortality in this age group began to increase and the intensity of migration began to decrease. This tendency remained without reference to any observing time point. It means that the migration role reduced not only in 1999, but also in the future period. For females the impact of migration for age groups twice decreased in age group 35-39 years, nevertheless the influence of migration remained till age group 60 years and over in less intensity than in younger ages (Appendix 3, Fig. 1, Fig. 2).

If in 1999 the impact of mortality for males' age structure began from age group 50-54 years, then in 2001, 2003 and 2008 it rejuvenated and shifted to age groups 40-44 years and 35-39 years respectively. In these age groups the intensity of mortality in these years did not change, while, in 2008 in comparison with 1999 the age-specific net migration rate six times decreased in age group 35-39 years, 25 times in age group 40-44 years. It was a reason of rejuvenating the impact of mortality on development of males' age-structure. For females in these age groups the intensity of migration increased in these years, excluding 2008 when the intensity of migration in these age groups in comparison with 1999 four times declined. Also for females till 2008 the impact of migration subsided in age group 60 years and over, in 2008 it was in age group 45 years and over, since the intensity of migration decreased in the last year of observation (Appendix 3, Fig. 1 and Fig. 2).

9.2 Urban and rural settlements of the region

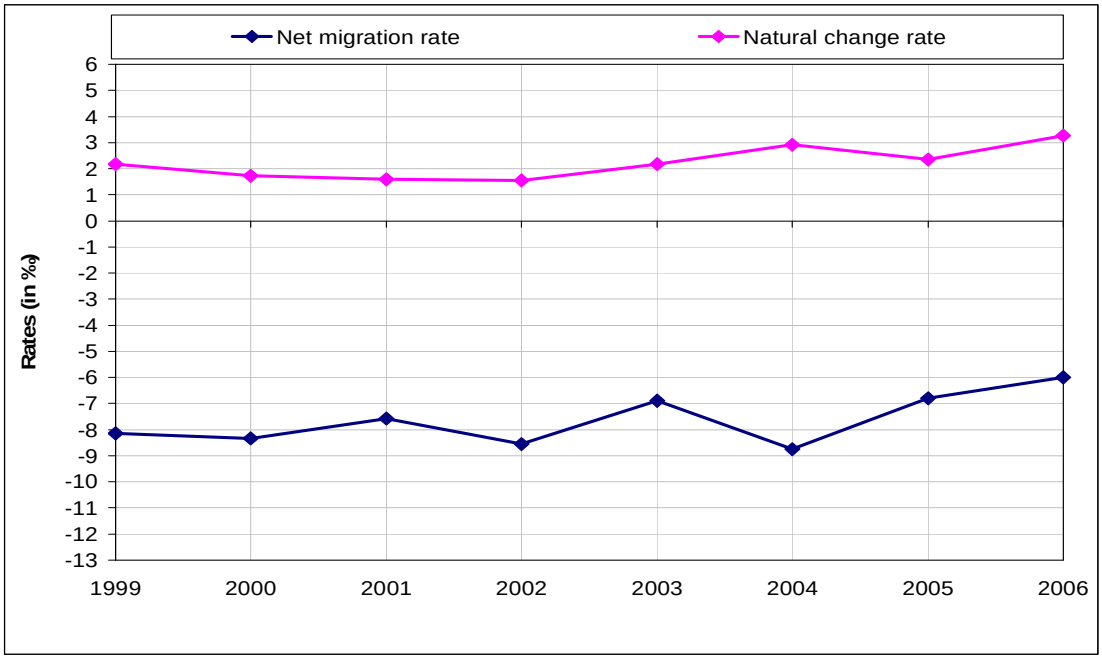
In population development in urban and rural settlements the impact of migration in 1999-2006 was the following: the influence of migration on demographic development in urban and rural areas was higher than the natural population change. For instance, in 1999 net migration rate in rural areas was four times higher than natural change rate, and at the same time natural change rate in urban areas was three times lower than net migration rate. In average, net migration rate was nine times higher in urban areas in 2003-2006, whereas in rural areas it three times fell (Fig. 17, Fig. 18).

Fig. 17: Urban population development by migration and natural change, East Kazakhstan region, 1999-2006



Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

Fig. 18: Rural population development by migration and natural change, East Kazakhstan region, 1999-2006



Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

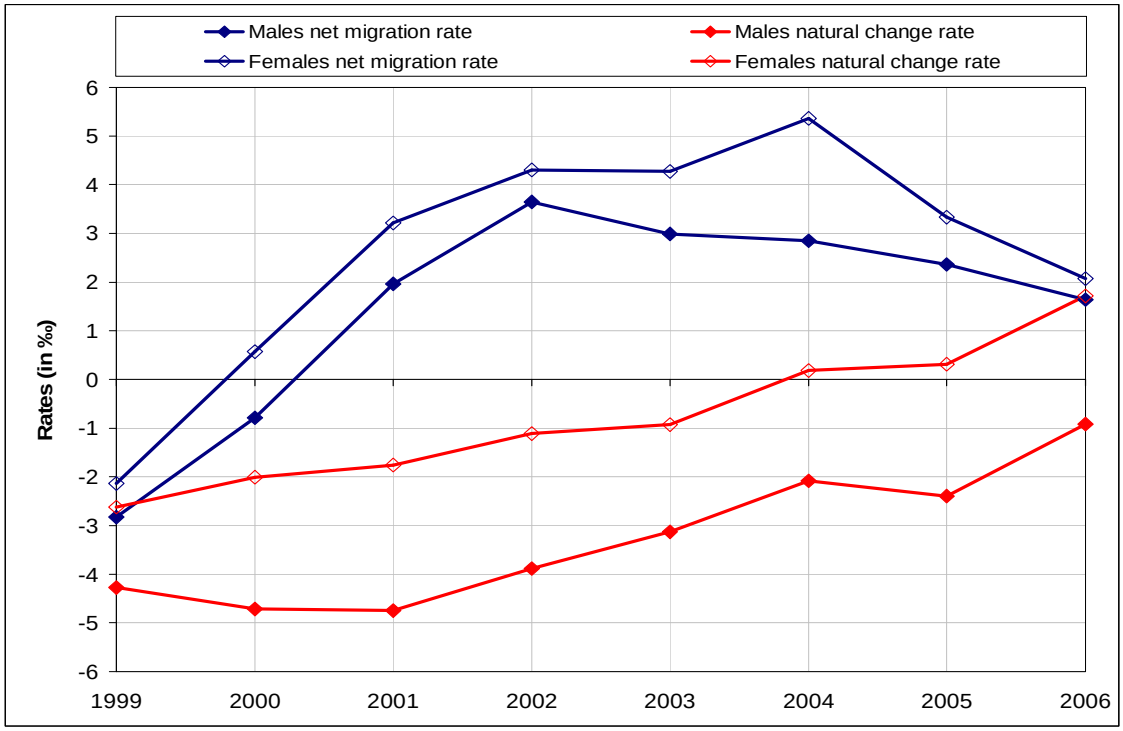
The intensity of net migration in urban settlements was higher than in rural settlements for males as well as for females. The general trend for urban settlements was the decrease of net migration rate for both sexes, while in rural settlements it was quite the contrary. In average, the

difference between females' and males' net migration in urban settlements was higher than in rural settlements. For urban settlements this difference was in average 1.6 per mile, while in rural settlements − 0.2 per mile in 1999-2006. Males' intensity of migration decreased to 3.9 per mile in urban settlements, while in rural settlements it decreased to 1.9 per mile. For females the decrease was 4.5 per mile in urban settlements and 2.4 per mile in rural settlements. In urban settlements females' net migration rate was positive from 2000, while males' one – from 2001. Also in urban settlements males' natural change rate was negative in the whole observed period, while females' one was positive from 2004. In urban settlements males' net migration intensity level was higher than females' one, whereas in rural settlements females' net migration rate was higher than males' one. The value of males' natural change rate was higher than the value of males' net migration rate. From this we assumed that decline of males' population in urban areas was more caused by natural change of population than migration (Fig. 19, Fig. 20).

For females some strange fact took place: the level of net migration was positive, moreover from 2001 net migration rate exceeded the rate of natural change and in 2004 net migration rate was five times higher than natural change, while in 2006 the level of these rates was equal (2 per mile). In 2006 in comparison with 2004 net migration rate decreased to 3 per mile, while natural change rate increased to 2 per mile. Despite this, the females' population in urban areas declined. There should be an increase of females' population in conformity with the law that if the net migration rate of the population was positive and its level exceeded the level of natural change, the population was growing. Probably there was an error in the migration data, because most migrants did not fill in registration cards. Moreover, there was no other explanation of this incompatibility in relationship between rates of natural change and net migration and population development (Fig. 19).

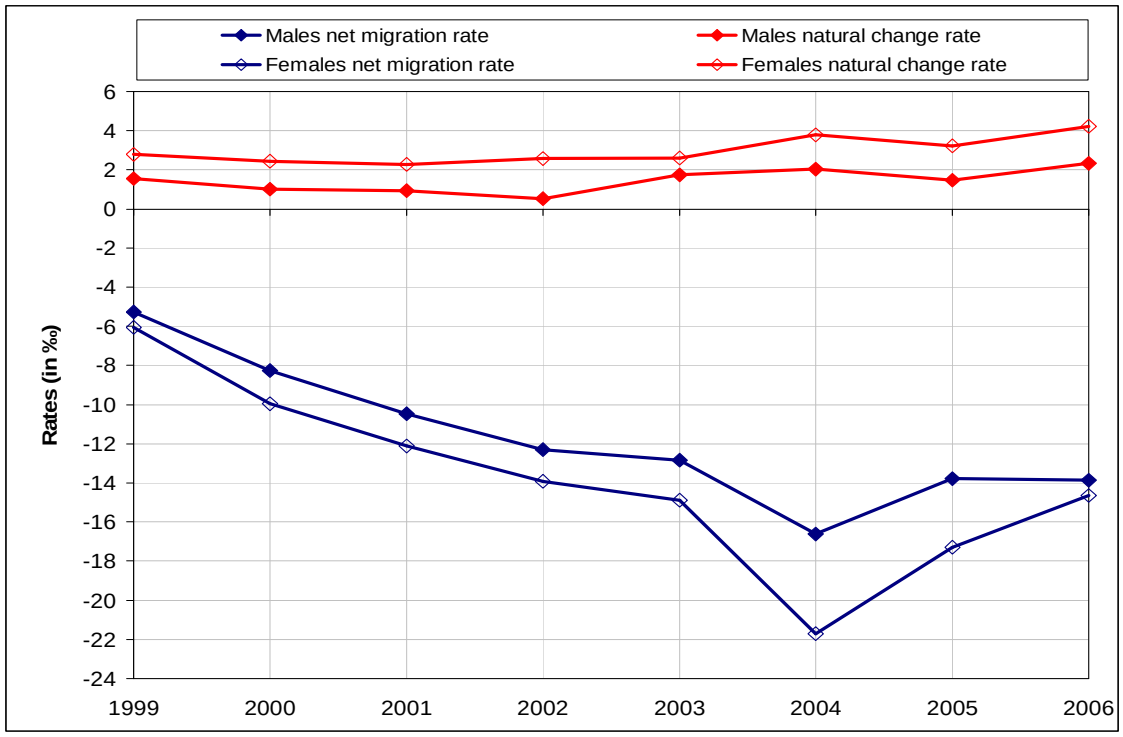
Rural males' and females' rates of natural change and net migration presented the following situation: for both sexes natural change rate was lower than net migration rate. In 1999-2006 natural change rate was stable for both sexes, whereas, the net migration rate fluctuated and increased in comparison with 1999 two times in 2000-2003, four and three times in 2004 and 2005 for females. For males in comparison with 1999 the net migration rate increased two times 2000-2003 and three times in 2004-2006. From this we concluded that in last years under the observation the decline of population of both sexes in rural areas was due to migration mostly (Fig. 20).

Fig. 19: Urban population development by migration and natural change according to sex, East Kazakhstan region, 1999-2006



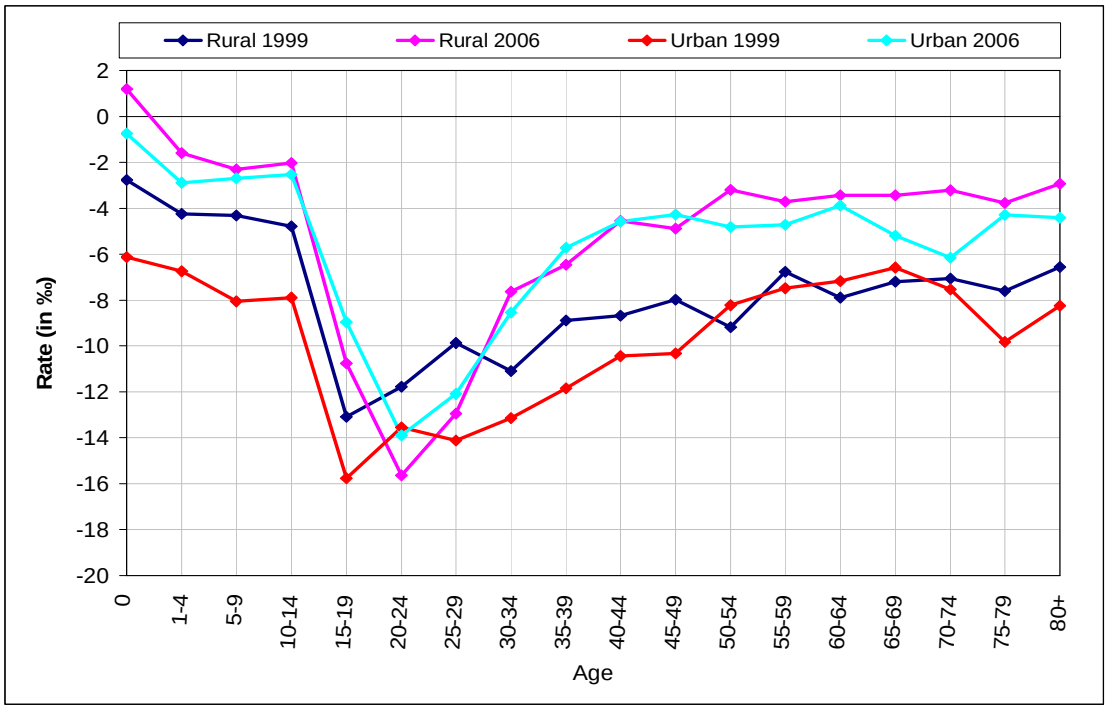
Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

Fig. 20: Rural population development by migration and natural change according to sex, East Kazakhstan region, 1999-2006



Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

Fig. 21: Age structure of net migration by the type of settlements, East Kazakhstan region, 1999 and 2006



Source: Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

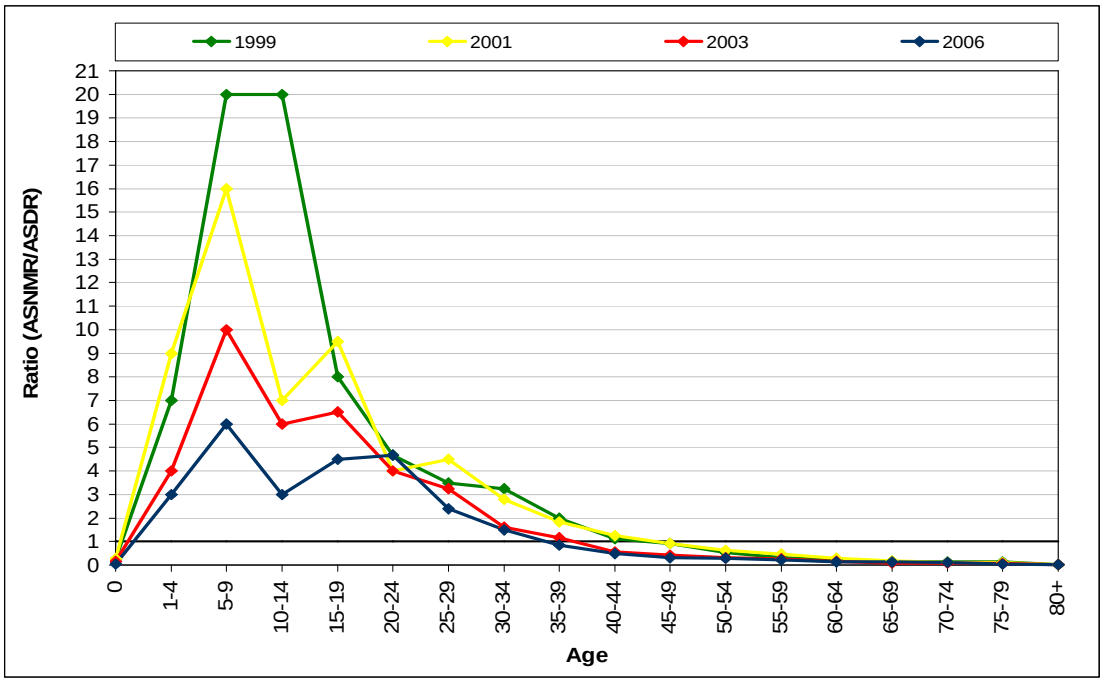
The change in the age pattern of migration in urban and rural settlements was the following: in 1999 the highest proportion of migration intensity was in age group 15-19 years and in 2006 it shifted to the next age group 20-24 years for both settlements. In 1999 net migration rate of age group 55-59 years sharply declined in rural settlements, while in 2006 it was smoother, without any particular changes. The intensity of migration by age in urban settlements was higher than in rural settlements in all age groups, excluding age group 20-24 years for both years. Probably people in this age group moved out from rural and urban settlements in order to get education and search a job. However, in 1999 migration intensity was higher in rural settlements in age groups 50-54, 60-64, and 65-69 years, which was explained by the movement of older people from rural to urban settlements after retirement. Because living conditions in urban settlements were better than in rural settlements, and people could easily leave these places. Most of their children live in cities and they persuaded their parents to live closer to them. In general, the age-specific migration intensity in age group 15-29, 35-39 and 35-49 years in rural area was higher than in urban settlements in 2006. From this it can be assumed that it was a family migration, when parents move from rural settlements to urban settlements with their children to give their children better education. In addition, it can be an oralmans' network migration from the East Kazakhstan region to other regions of Kazakhstan and to the capital city Astana. Relatives and friends of the new movers who moved to other regions of Kazakhstan, Astana, and Almaty cities drew them to these settlements. However, oralmans live not only in rural but also in urban settlements of the region. In 2006 the increase of migration intensity in older ages (60 years and

over) was observed in both categories of settlements; it can be explained by return migration of oralmans to the places of their departures, because for older people the adaptation to new life conditions, climate and society is not easy. Moreover, the movers from urban settlements at older ages can be people of European ethnicities (Germans, Russian) who prefer to return to their "Historical Motherland" after retirement (Fig. 21).

When we subdivided the ratio between age-specific net migration and mortality rates in rural and urban settlements, we saw that among the age groups in urban and rural settlements the level of the ratio was different. In urban areas it is higher than in rural areas. Moreover, age groups 1-39 years in urban areas and 1-44 years in rural areas developed under the impact of migration mostly. Furthermore, it should be noted that age-specific intensities of this ratio in urban settlements are lower than in rural settlements in age groups 34-64 years in 1999, 15-29 years in 2001, 14-54 years in 2003, and 15-44 years in 2006. In other age groups in urban settlements this ratio was higher than in rural ones. This difference by age in urban and rural settlements was due to the fact that mortality intensity by age in urban areas increases in earlier ages than in rural areas. In urban settlements the highest impact of migration on development of age structure was in age groups 5-9 years and 10-14 years in 1999, and in other years it was age group 5-9 years. For rural areas this age group was 15-19 years for all years. Probably these disparities in age groups by the highest impact were due to the selection of migration intensity by place of settlements. It means that migrants in age group 5-14 years were the children who moved with their parents from urban areas, and migrants from age group 15-19 years in rural areas were school-leavers and university entrants. For example, pupils at ages 15-16 years old who leave basic secondary school, i.e., pupils after the ninth grade (class) enter mostly professional schools and colleges. Then pupils leaving general secondary school, i.e., pupils after the eleventh grade (class) enter universities. So, they were educational-migrants. The age group 1-34 years in urban areas developed under the influence of migration in all years of observation, whereas age group 35-39 years in 1999, 2001 developed under the impact of migration since the ratio was two, and in other years this age group developed under the influence of migration and mortality, since the value of the ratio is one. In urban settlements the age group 40-44 years developed under the impact of both of them in all years, while the age group 45-49 years developed under the impact of both of them in the first two years of observation, and in the next years it developed under the impact of mortality in urban areas. However, from age group 50 years and over the role of mortality in the development of the population age structure was observed in all years. In rural areas the development of age group 40-44 years fluctuated depending on the year of observation, i.e., in 1999, 2003 this age group developed under the impact of migration, whereas, in 2001 and 2006 – under the impact of both of them. It was a result of migration intensity fluctuation level in these years in this age group, since the level of mortality intensity was stable. In rural areas the last age group which developed under the influence of migration was age group 45-49 years in 1999. In other years the development of this age group was under the impact of both of them. For age group 50-54 years, in 1999 this age group developed under the impact of both of

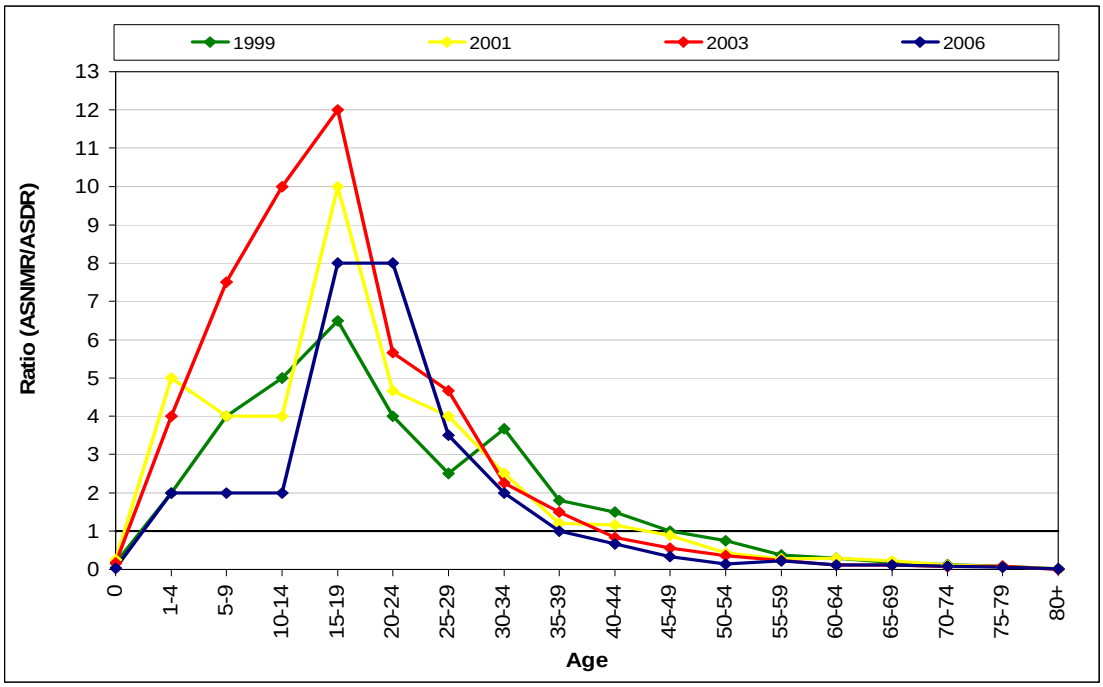
them. Then in the next years it developed under the impact of mortality. Then the age group 55 years and over developed under the impact of mortality in rural areas (Fig. 22, Fig. 23).

Fig. 22: The role of migration in urban population age structure development, East Kazakhstan region, 1999, 2001, 2003, and 2006



Source: Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

Fig. 23: The role of migration in rural population age structure development, East Kazakhstan region, 1999, 2001, 2003, and 2006



Source: Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

This distribution of the ratio by age groups according to urban and rural settlements once more proved that migration impact on development of population age structure subsides in rural areas later than in urban areas. The fluctuation of the ratio by years from age group 45 years and over in rural areas, and from age group 40+ years in urban areas shows that the role of migration in older working age groups much depends on the change of migration intensity, because the level of age-specific mortality intensity in any way increases age by age and its role in population age structure increases from these age groups by settlements categories.

Subdividing the ratio by sex in urban and rural settlements showed that the role of migration in development of particular age groups for males and females was different. It means that in urban areas for both sexes the age, when migration role in development of particular age groups takes a step back, was younger than in rural areas. For both sexes in urban settlements the ratio in 2003 and 2006 was approximately three times lower than in previous years in age groups where the impact of migration is the highest one. For males these ages are 1-19 years old, while for females these ages were 1-29 years old. In urban and rural settlements females' age structure was more exposed to migration than males' one, because the ratio for females was higher than males' ratio. For example, in 2006 in urban settlements the ratio for males in age group 15-19 years was 4, while for females this ratio was 11, i.e., three times higher than for males. At the same time for the same age group in rural areas males' and females' ratios were 7 and 10 points correspondingly. In age group 20-24 years males' ratio decreased to one point, while females' one in the same age group did not change in urban areas in 2006 (Appendix 3, Fig. 3, Fig. 4, Fig. 5, and Fig. 6). These changes in values of ratio by sex proved our assumption about the role of migration in development of population sex ratio in urban and rural settlements. For instance, in 2006 the sex ratio in age group 15-19 was 99 males per 100 females, and 111 males per 100 females in rural settlements. In the same year in the next age group the proportion of males to females decreased in urban areas, while in rural areas it increased (Tab. 5). The distribution of the ratio of net migration and mortality rates in these age groups clearly proved that for males' and females' distribution by age or proportion of males to females in this age group migration played a very important role. In age group 20-24 years females' ratio between net migration and mortality rates was the same as in age group 15-19 years, but in comparison with males' ratio, it was three times higher. If the ratio did not change, but the sex ratio showed that males' proportion in this age group was lower than females' one, then for decreasing of the males' proportion in this age group it had to be another factor. In view of the aforesaid the distribution of the ratio between net migration and mortality presented that this factor was mortality. From this we see that our assumption that in urban areas decreasing of the males' proportion in age group 20-24 years was intensified by mortality was correct. Moreover, the level of the ratio between net migration and mortality rates for females was higher to three points in rural areas than in urban areas in this age group. According to this in rural areas the

proportion of males in this age group was higher, which proved our assumption that migration played a significant role in development of this age group in rural areas.

The increase and decrease of the role of migration in development of population age structure by sex had points or ages of increasing and decreasing. Moreover, these ages varied in 1999-2006. For instance, in urban areas in age group 25-29 years for males in 1999, 2001, and 2003 development was owing to migration and in 2006 − owing to migration and mortality. In 1999 and 2001 males in age group 30-34 years developed under the influence of migration, then in 2003 and 2006 this age group developed under the influence of migration as well as mortality in both categories of settlements. For males' age group 35-39 years development was under the impact of both of them during all the considered period in urban and rural areas. Males in age group 40-49 years developed under the influence of both of them in 1999 and 2001, and in 2003 and 2006 this age group developed under the influence of mortality in both categories of settlements. In 1999 from age group 50 years and over in urban areas males' population developed under the influence of mortality, while the same age group males in rural areas developed under the influence of both of them and in the next years this age group developed under the influence of mortality. It was due to the fact that in 1999 intensity of net migration was very high, since the echo of migration intensity after the collapse of USSR resounded in 1999 (Appendix 3, Fig. 3, Fig. 5).

For females in urban areas the situation was the following: excluding 2006 age group 35-39 years developed under the influence of migration and the level of ratio decreased to one point in 2003 in comparison with two previous years, in 2006 this age grope developed under the influence of both of them. The age group 40-49 years developed under the influence of migration and in the next two years of observation developed under the impact of both of them. The age group 50-54 years developed under the impact of migration as well as mortality in all years, while the age group 55-59 years developed under the influence of mortality and migration in 1999, 2001, 2003, and in 2006 it developed under the influence of mortality only. The age group 60 years and over developed under the impact of mortality in all considered years. For females in rural areas situation is the following: the age group 1-39 years developed under the influence of migration in these years. The age group 40-44 years developed under the influence of migration in 1999, 2001, and then in 2003 and in 2006 it developed under the influence of both of them. The age group 45-49 years developed under the influence of mortality and migration in all years, while the next age group 50-54 years developed under the influence of both of them in 1999, 2001, 2003, then in 2006 developed under the influence of mortality. In 1999, 2001 the age group 55-59 years developed under the influence of migration and mortality, whereas in 2006 this one developed under the impact of mortality. Either in urban areas or in rural areas the population of females older than age 60 developed under the influence of mortality (Appendix 3, Fig. 4, Fig. 6).

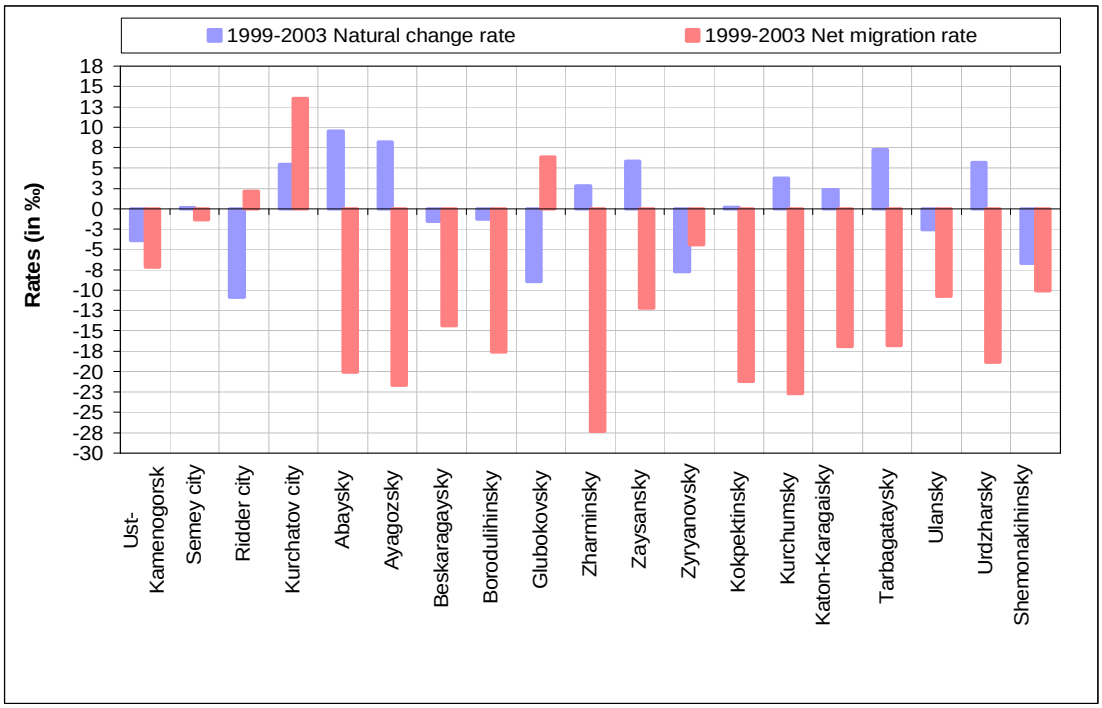
The variation of the ratio between age-specific net migration and mortality rates in years was a result of decreasing of migration intensity by age from 2003. We assumed that the high number of females leaving rural settlements was a result of educational migration. Most parents

think that males can work without any education in agrarian and agricultural spheres, while it is very important for females to have a degree, because they need to find a job. That is why females' intensity of migration was higher than males' one. As confirmed by Ravensteins' law of migration, females are more likely to migrate within the country of their birth than males, and males are more likely to migrate farther. From this it can be concluded that females had higher level of out-migration than males because they were more active in internal migration. Interregional migration to Astana, Almaty as well as to other neighboring regions can be considered as a short-distance migration.

9.3 Districts level

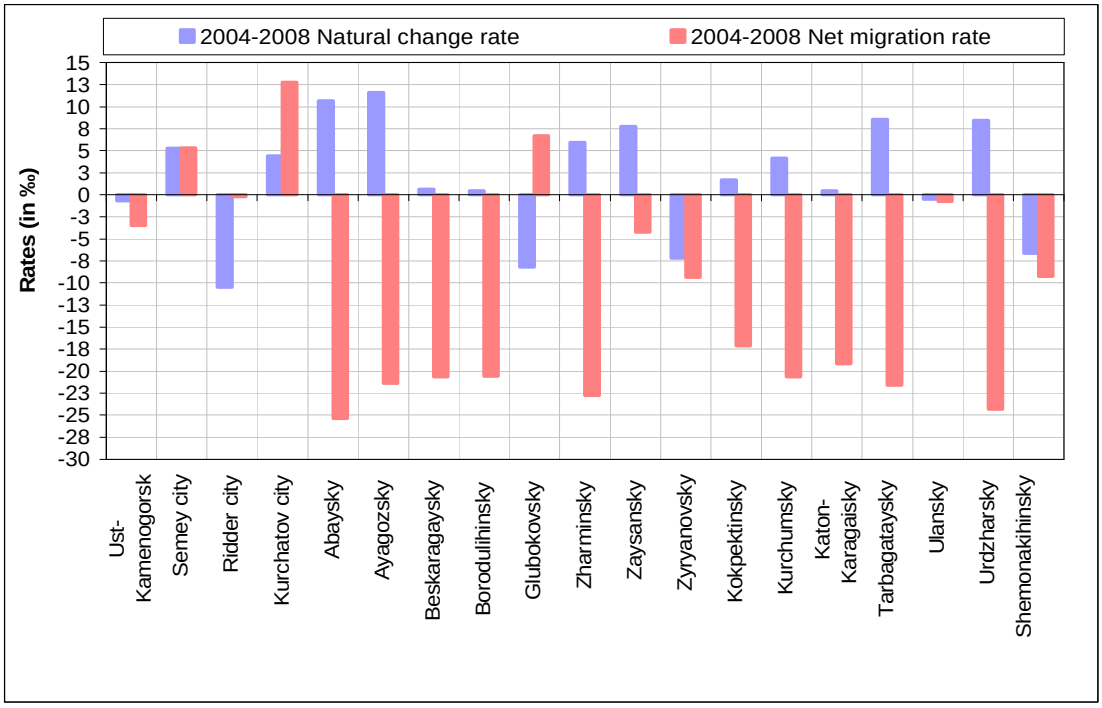
As noted above, the theory of mobility transition discovered the basic patterns of changes in the directions of migration flows. Migration flows alter the size and structure of the population of the region and its districts. Migration consists of the following directions: village → nearest city → regional capital → national capital. In case of the East Kazakhstan region, this internal migration pattern does not work. Many of the villagers could escape from urban settlements of the region and immediately migrate to the national capital Astana and the metropolis such as Almaty city.

Fig. 24: Population development by migration and natural change at the level of districts, East Kazakhstan region, 1999-2003



Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

Fig. 25: Population development by migration and natural change at the level of districts, East Kazakhstan region, 2004-2008



Source*:* Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

Usually, migration to administrative centers (or capitals) of the states and regions should be higher than to other cities or settlements of destinations. In case of Ust-Kamenogorsk, it was quite the contrary. The in-migration to Semey and Kurchatov cities were more attractive than to the administrative center of the region. As mentioned above, Semey and Kurchatov cities were a home-based area for oralmans. The high intensity of in-migration to these cities could be also connected with language problems. The oralman-immigrants can not speak Russian. Semey city is the Kazakh-language city, while, in Ust-Kamenogorsk the most people speak in Russian. In addition, ecological situation in Ust-Kamenogorsk can be the reason why people arrive less to the administrative center.

The number of migrants between two periods in some districts increased, in some districts decreased, in some districts did not change. All districts had negative net migration in 1999-2003. Most of the in-migrants moved from rural settlements to urban settlements. In 1999-2003 almost all districts, excluding Ridder city and Kurchatov city had a negative net migration. In Kurchatov city and Ridder city the number of in-migrants was higher than the number of out-migrants. After the collapse of the Soviet Union people began to move out from Kurchatov city. Since the nineties there were difficulties with work and wages. Kurchatov is one of the former Soviet Union centers of the development of the atomic bombs. After closing the testing area of the region all research institutes in the city were closed. It was one of the push factors for moving from the city. In the premises of the Semipalatinsk test site the National Nuclear Center of Kazakhstan with a lot of its subsidiaries was established: the Institute of Geological Research, Institute of Nuclear Physics,

Institute of Atomic Energy, and many other organizations which use civil nuclear power and unite science and business. Nowadays Kurchatov is one of the dynamically developing cities of the region.

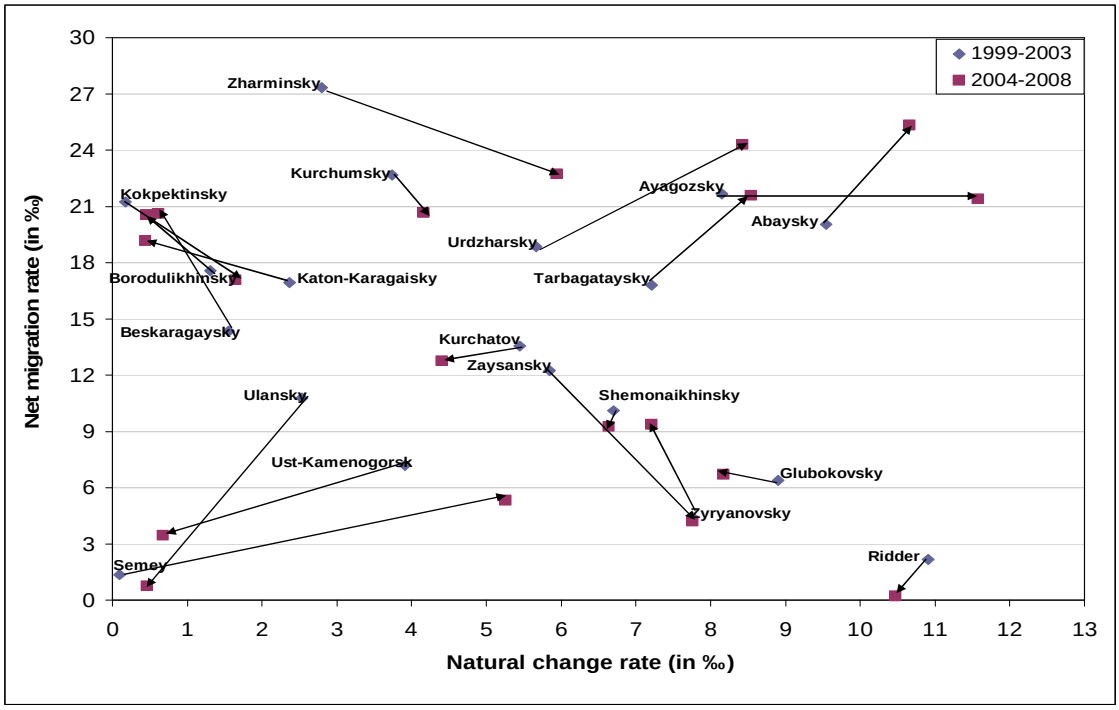
In the first period of observation negative natural change rate was observed in Ridder city (10.9 per mile), Glubokovsky (8.9 per mile), Zyryanovsky (7.8 per mile), Shemonaikhinsky (6.7 per mile), Ust-Kamenogorsk city (3.5 per mile), Ulansky (2.5 per mile), Beskaragaysky (1.5 per mile), and Borodulikhinsky districts (1.3 per mile), in other districts it was positive, but at different levels. From this we see that negative natural change rate was due to the fact that in the districts there was an old age structure of population, where the level of natality is low and the level of mortality is high. Moreover, in these districts the European ethnic groups prevailed in the ethnic composition of the population. The reason of the negative natural change was a low level of natality and a high level of mortality. Also the negative natural change is observed mostly in the districts situated close to the administrative center and their economic orientation was industrial. However, in these districts the level of net migration rate was different. For instance, in Ridder city 2.2 per mile, in Kurchatov city 13.3 per mile, while the natural change rate is 5.4 per mile. It means that net migration rate was five and two and half times higher than natural change in these cities correspondingly. For example, in Semey city net migration rate was 14 times higher than natural change rate in 1999-2003, but it stayed at the same level without any changes in 2004-2008. In the first period in Ust-Kamenogorsk city net migration and natural change rates were 7.5 and 3.9 per mile. From this point of view, the city population development was influenced by these two elements. In Semey city the proportion of in-migrants exceeds out-migrants in 2004-2008 (Fig. 24, Fig. 25).

The less attractive regions for in-migration in both periods were Abaysky, Ayagozsky, Tarbagataysky, and Urdzharsky districts. Tarbagataysky and Urdzharsky districts, locate far from the administrative center of the region. The economic orientation of the districts is agriculture and cattle breeding. It is an important point since not all people could work in agricultural sector since collective farms in the region as well as in Kazakhstan were privatized. Not all people have a possibility to work by themselves after the collapse of Soviet Union. Abaysky and Ayagozsky districts can be less attractive for migration because of ecological situation of these settlements. There were nuclear explosions in the Soviet period there. Also in these districts we observed one of the highest rates of out-migration. It is because the age structure of the population in these districts is young and accordingly, mobility intensity is high.

In 2004-2008 these districts changed their values of net migration and natural change rates. In Semey city the significant increase of natural change rate amounted to about 44 times (from 0.1 per mile in 1999-2003 to 5.3 per mile in 2004-2007). In Ust-Kamenogorsk city the negative value of natural change rate changed from 3.9 per mile to 0.7 per mile. In Zharminsky district natural change was 2.8 and 5.9 per miles, and net migration rate was 27.3 per mile and 22.7 per mile in first and second sub periods. It means that net migration rate was ten and four

times higher than natural change rate, and natural change can not play such a fundamental role in population development as migration. In the second period natural change rate rise and then it played a more substantial role in population development. For example, in Zaysansky district natural change rate increased one and half time (from 5.8 per mile in 1999-2003 to 7.8 per mile in 2004-2008), while net migration rate three times decreased (from 12.2 per mile in 1999-2003 to 4.2 per mile in 2003-2008). From this we conclude that the changes of natural change rate between the periods led to decreasing the role of migration in population development among the districts (Fig. 24, Fig. 25).

Fig. 26: Distribution of districts by difference between net migration and natural change rates, East Kazakhstan region, 1999-2003 and 2004-2008



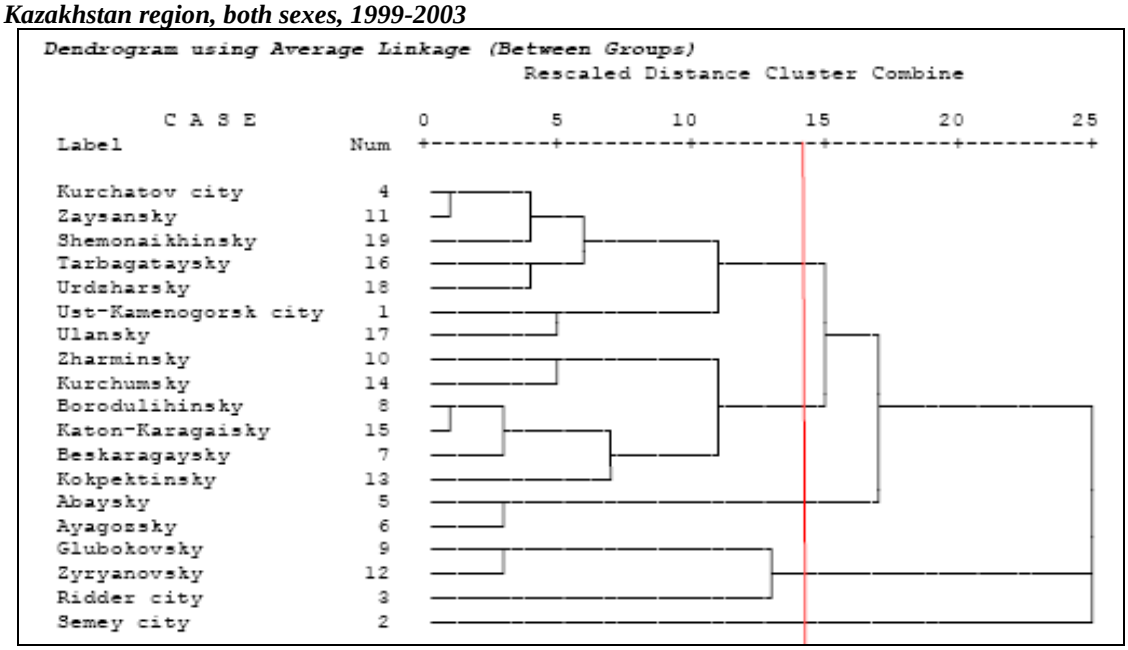
Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

The distribution of districts by the difference between net migration and natural change rates in 1999-2003 and 2004-2008 was based on the classification of districts of the region by the role of migration in population development. The changes in both periods by two components of population change illustrated that most districts developed under the influence of migration. However, the demographic development in Ridder city and Glubokovsky district was due to natural change, because the difference between two rates was negative in both periods. Moreover, the influence of natural change on population development in Ridder city was higher than in Glubokovsky district and amounted to 5 per mile in 1999-2003 and to 8.8 per mile in 2004-2008. If in the first period in Zaysansky district population development was under the influence of migration, than in the next period it was under the influence of natural change, because migration intensity decreased and natural change intensity increased which was mentioned above. In Zyryanovsky district the change between periods was quite different. In the first period the change

of population size in Zyryanovsky district was due to the natural change and in the second period it was because of the influence of migration, since migration intensity increased and exceeded natural change (Fig. 26).

The change of the difference between two rates in Ust-Kamenogorsk and Semey cities was not so significant (0.6 per mile for both cities). The difference between two cities was that the population of Semey city in the second period developed under the influence of migration as well as natural change, while in Ust-Kamenogorsk city population change was more due to migration. The changes between two periods in Ulansky district showed that in this district the development of population size was due to migration in the first period and in the second period the influence of migration was only 0.3 per mile which means that population change was influenced by migration as well as by natural change. It happened because the intensity of migration in the second period decreased rapidly, and the level of natural change did not change so much, which was described above (Fig. 26). In other districts population development was caused more by migration than by natural change. In most of them, excluding Shemonaikhinsky district, Ust-Kamenogorsk city and Semey city, the difference between two rates was more than 5 per mile in both periods. In some districts the difference between two rates during these periods increased. In Kurchatov, Semey, Ridder cities, Zharminsky, Kurchumsky, Kokpektinsky, Ulansky, Shemonaikhinsky, and Zaysansky districts it decreased, in other places increased (Ust-Kamenogorsk city, Ayagozsky, Beskaragaysky Borodulikhinsky, Glubokovsky, Katon-Karagaisky, Tarbagataysky, Urdzharsky, Zyryanovsky, and Abaysky districts) (Fig. 26).

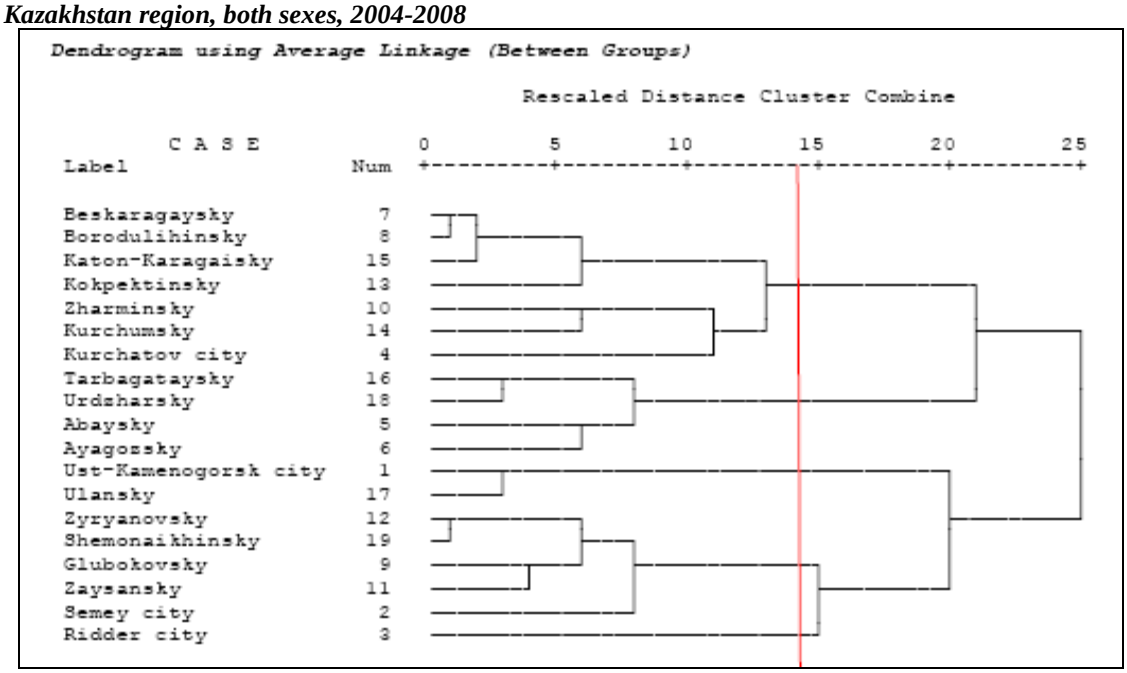
Fig. 27: Classification of districts by the role of migration in population size development, East Kazakhstan region, both sexes, 1999-2003



Note: the red line is the level of cutting dendrogram into cluster groups

Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

Fig. 28: Classification of districts by the role of migration in population size development, East Kazakhstan region, both sexes, 2004-2008



Note: the red line is the level of cutting dendrogram into cluster groups

Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

These changes of migration and natural change intensities by periods joined districts together. In the first and second periods we cut the dendrogram at the level 14, and there were five groups (clusters) of districts by similarities and dissimilarities. However, the memberships in these clusters between two periods were changed. In the first period the first cluster includes Ust-Kamenogorsk and Kurchatov cities, Zaysansky, Shemonaikhinsky, Tarbagataysky, Urdzharsky, and Ulansky districts. In the second period the first cluster members changed and Ulansky district and Ust-Kamenogorsk city set up their own separate third cluster, others, excluding Kurchatov city, moved into other clusters. After that Kurchatov city, Zharminsky, Kurchumsky, Borodulikhinsky, Beskaragaysky, Katon-Karagaisky, Kokpektinsky districts were in the first cluster. The second cluster of the first period included Zharminsky, Kurchumsky, Borodulikhinsky, Beskaragaysky, Katon-Karagaisky, and Kokpektinsky districts. In the first period in the third and the fourth clusters the members were Abaysky, Ayagozsky districts and Glubokovsky, Zyryanovsky districts, and Ridder city. Also in the first period Semey city built its own fifth cluster. In 2004-2008 the second cluster included Tarbagataysky, Urdzharsky, Ayagozsky, and Abaysky districts, while the fourth one included Zyryanovsky, Shemonaikhinsky, Glubokovsky, Zaysansky districts. In the second period Ridder city set up its own fifth cluster (Fig. 27, Fig. 28).

Further, considering each cluster separately in the first period it can be observed that the combination of districts was as follows: Shemonaikhinsky district did not join any district, while Kurchatov city and Zaysansky district, Tarbagataysky district and Urdzharsky district,

Ust-Kamenogorsk city and Ulansky district united. As wee see the united districts excluding the first one are neighborhood. The first united districts are located far from each other, but the reason of their joining was that net migration intensity in these districts was similar. It means that when we erased the negative sign from the value of net migration of Zaysansky district their net migration rates were equal (13 per mile). Also the similarity of migration intensity between Kurchatov city and Zaysansky district can be explained by the fact that Kurchatov city is one of the main home-bases for immigration of oralmans, while in Zaysansky districts migration has economic causes, since in Zaysansky district an oil-gas field was discovered, which is attractive for business and population migration for new jobs and economic perspectives.

In the second cluster Kokpektinsky and Beskaragaysky districts did not join any districts, while Zharminsky and Kurchumsky, Borodulikhinsky and Katon-Karagaisky districts united. The feature of this cluster is that its members are agricultural districts. Excluding Borodulikhinsky district, in these districts in population ethnic composition Kazakhs are the largest group and situated far from the administrative center. They are agricultural and migrant-donor districts (Fig. 27; Appendix 4, Tab. 1).

The members of the third cluster are situated close to Semey city, migrants from these districts can move, for instance, to Semey city with the same intensity and in both of them most people are Kazakhs. The feature of this cluster is that it has a high level of natality and positive natural change in comparison with other districts, population declined (Fig. 27, Appendix 4, Tab. 1).

Hypothetically, the factor of joining districts in the fourth cluster is explained by the fact that the population in these districts developed under the influence of natural change mostly. Glubokovsky and Zyryanovsky district in the fourth cluster joined each other, while Ridder city did not join, since as it is shown in Figure 26 Ridder city is the district which has the highest influence of natural change for population size development. The feature of the fourth cluster is that its members are industrial districts with prevalence of European ethnic groups in ethnic composition of the population, they are neighbor districts situated in the north part of the region, and border on Russian Federation. There is a high level of negative natural change in comparison with other districts and the highest population decline. In this cluster the members are migrant-donor districts, excluding Glubokovsky district, which is a migrant-recipient district (Fig. 27; Appendix 4, Tab. 1).

Migratory behavior of population as well as natural change pattern in Semey city is different from other districts, and that is why Semey city has a separate cluster. Intensity of net migration and natural change were close to each other and the population developed under the influence of both of them as mentioned above. Based on this fact it can be assumed that it could be a reason of the selection of Semey city into a separate cluster. It is the second big city in the region, the center of inflow of migrants or a migrant-recipient region and one of the important industrial centers of the region (Fig. 27; Appendix 4, Tab. 1).

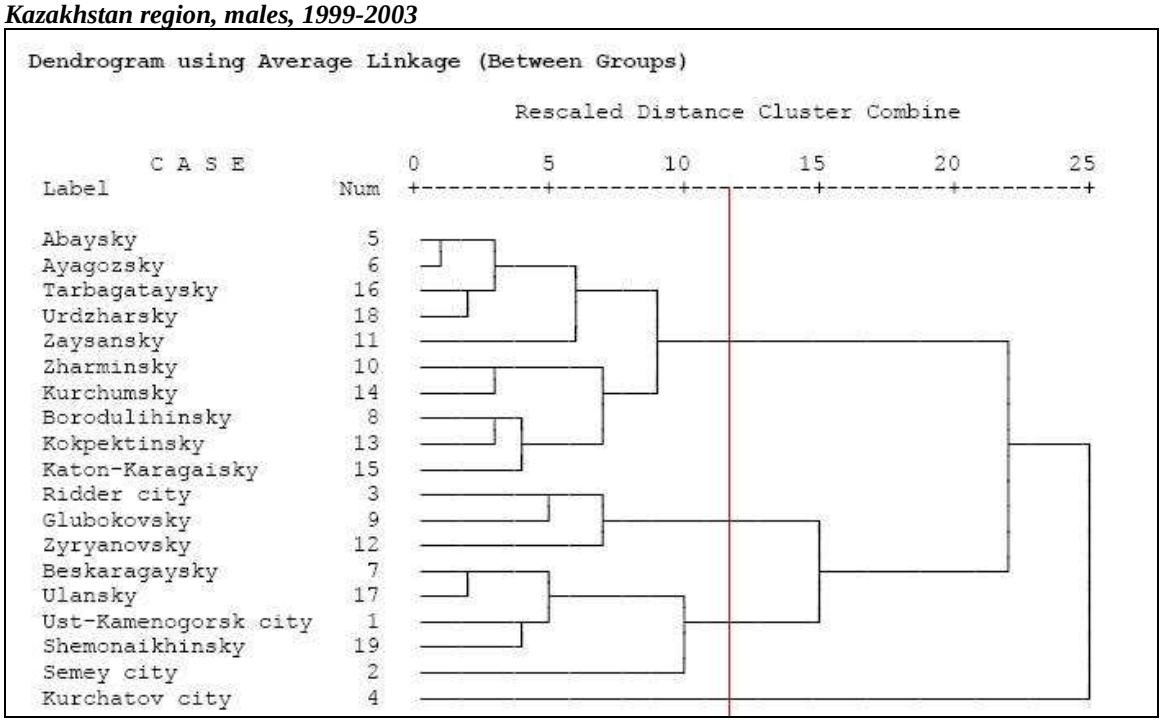
In the first period the classification of districts into one cluster has no strong general similarities since the intensity of migration in the last ten years had so many fluctuations which had an impact on the result of cluster analysis. However, in the next period the combination of the districts into one cluster had some logic structure. Excluding Kurchatov city, in the second period the classification of districts by cluster was made by economic orientation of the districts. Kurchatov city could be included in the first cluster accidentally. The fact that it was not joined to any other district could prove it. Also in this cluster Katon-Karagaisky and Kokpektinsky districts did not unite with others. The feature of this cluster was that all members excluding Kurchatov city are agricultural districts and in these districts the population declined. They are situated far from the administrative center and they are migrant-donor districts. Other districts joined each other in the following combination: Borodulikhinsky and Beskaragaysky districts, Zharminsky and Kurchumsky districts (Fig. 28; Appendix 4 Tab. 2).

In the second cluster Tarbagataysky and Urdzharsky districts joined each other and Ayagozsky and Abaysky districts joined each other. In this joining we observe a strong geographical combination. These districts are situated in the south of the region and all of them had prevalence of rural population and Kazakhs in ethnic composition of the population. Moreover, in these districts the highest net migration rates were observed (Fig. 28; Appendix 4, Tab. 2).

Joining of Ulansky district and Ust-Kamenogorsk city in the third cluster showed that the intensity of migration in these districts was similar. Based on this analysis it could be assumed that the location of Ulansky district in the neighborhood with Ust-Kamenogorsk city played a key role in the formation of migration intensity in this district. The movement within the neighborhood is more intense than within distant lands. Moreover, if Ust-Kamenogorsk is more involved in international and interregional migration, Ulansky district is more attractive to intra-regional migration, especially to the administrative center (Fig. 28; Appendix 4, Tab. 2).

Concerning the fourth cluster the features of these districts were the same with the previous period. It should be noted that in the second period the members of the cluster were similar: a) they were industrial districts; b) their ethnic composition consisted from European ethnic groups mostly, excluding Semey city, where the most of the inhabitants are the Kazakhs. Also in population size development, excluding Semey city again, population decline was observed (Fig. 28; Appendix 4, Tab. 2).

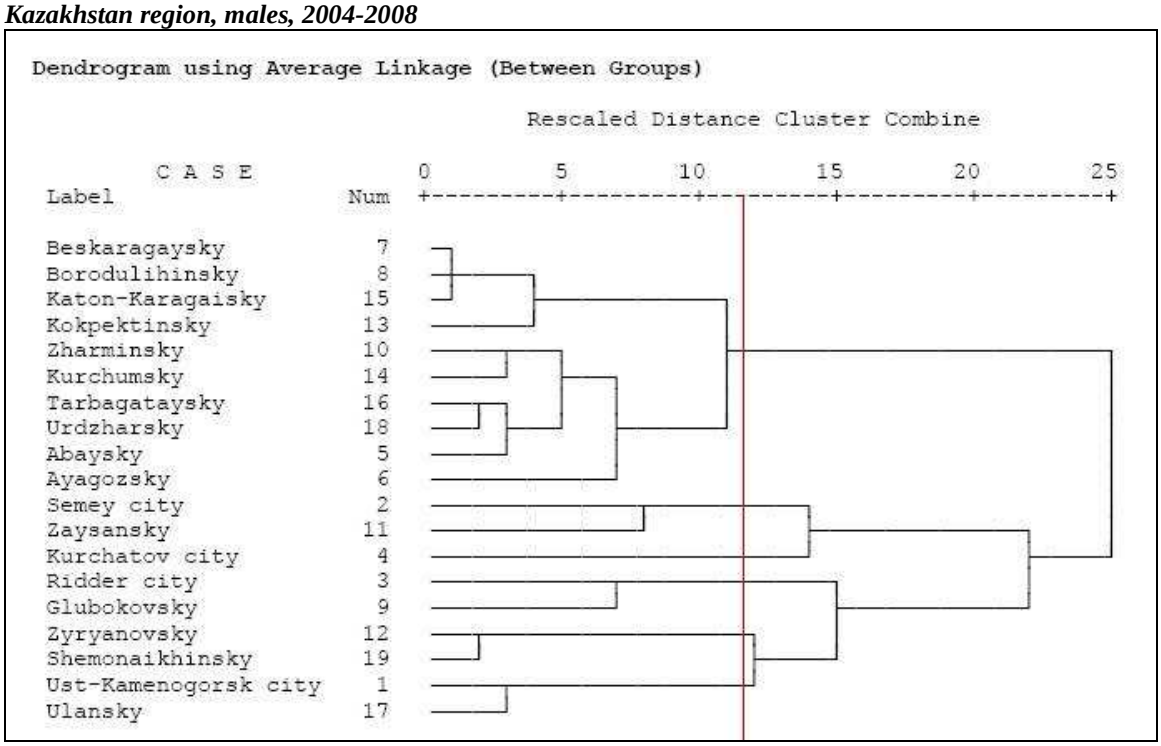
Fig. 29: Classification of districts by the role of migration in population size development, East Kazakhstan region, males, 1999-2003



Note: the red line is the level of cutting dendrogram into cluster groups

Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

Fig. 30: Classification of districts by the role of migration in population size development, East Kazakhstan region, males, 2004-2008



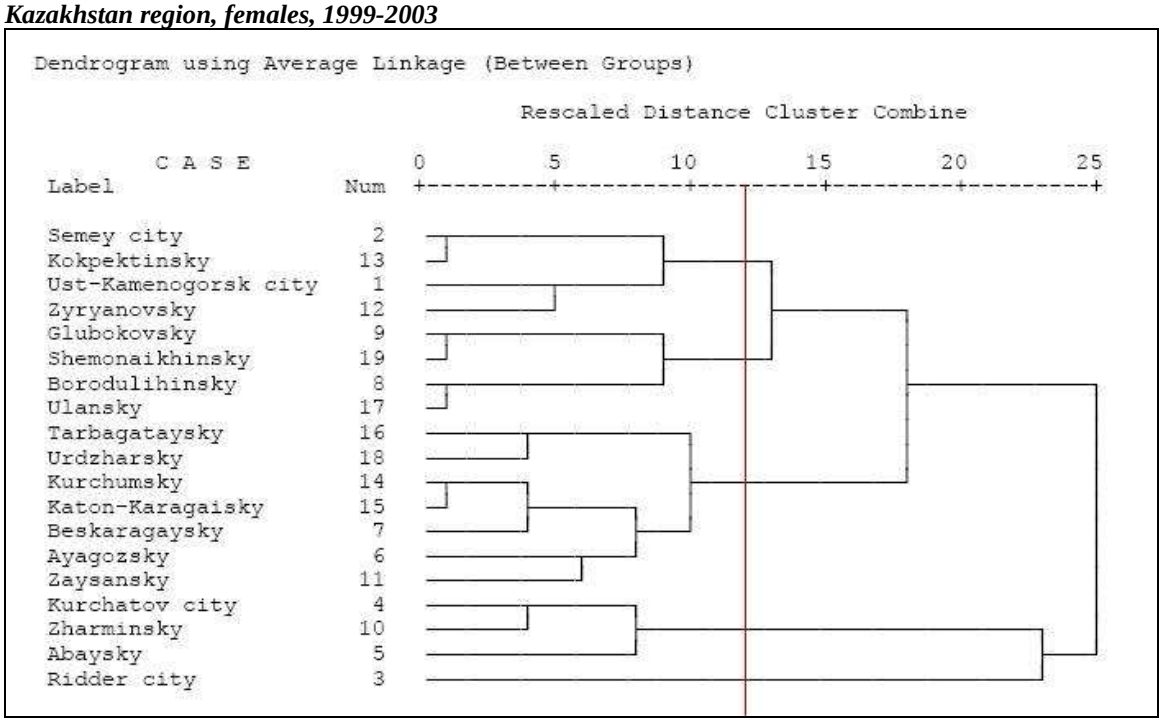
Note: the red line is the level of cutting dendrogram into cluster groups

Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

The dendrograms for males and females were cut at the level 12 for both periods. For males in the first period there were 4 cluster groups, while in the second period the number of cluster groups increased and there were 6 of them (Fig. 29, Fig. 30). For females in the first period there were 5 cluster groups, and in the second period there were 6 cluster groups too (Fig. 31, Fig. 32). The increase of the numbers of the cluster groups for both sexes was due to the fact that the members of the clusters moved to some separate clusters. It should be noted that the features of the cluster for males and females remained the same as for the total population in cluster groups.

The memberships of the cluster groups for males was the following: in the first period of observation the first cluster members were Abaysky, Ayagozsky, Tarbagataysky, Urdzharsky, Zaysansky, Zharminsky, Kurchumsky, Borodulikhinsky, Kokpektinsky, and Katon-Karagaisky districts. In this cluster Zaysansky and Katon-Karagaisky districts did not join the other members of the cluster, while Abaysky and Ayagozsky, Tarbagataysky and Urdzharsky, Zharminsky and Kurchumsky, Borodulikhinsky Kokpektinsky districts united between each other. The second cluster group members were Ridder city, Glubokovsky, and Zyryanovsky districts. The latter had no union with others. Ridder city and Glubokovsky district joined each other. The third cluster of the first period included Beskaragaysky, Ulansky, Shemonaikhinsky districts, Semey and Ust-Kamenogorsk cities. In the third cluster Beskaragaysky and Ulansky districts, Ust-Kamenogorsk city and Shemonaikhinsky district united between each other. Kurchatov city was in its own cluster group in the first period. In the second period in the first cluster almost all memberships remained the same and only instead of Zaysansky district Beskaragaysky moved in. Also in the first cluster of the first period Beskaragaysky, Borodulikhinsky and Katon-Karagaisky districts united between each other. Zharminsky and Kurchumsky, Tarbagataysky and Urdzharsky districts had their unions. In the same cluster Abaysky, Ayagozsky, and Kokpektinsky districts had no unions with other members of the cluster group. In the second period Semey city and Zaysansky district which were in different cluster groups joined the second new cluster group. Kurchatov city also had its own cluster group in the second period. The members of the fourth cluster group were Ridder city and Glubokovsky district. Zyryanovsky and Shemonaikhinsky districts got out from their cluster groups of the first period and joined the fifth cluster group in the second period. Also Ust-Kamenogorsk city and Ulansky district separated into their own sixth cluster group (Fig. 29, Fig. 30).

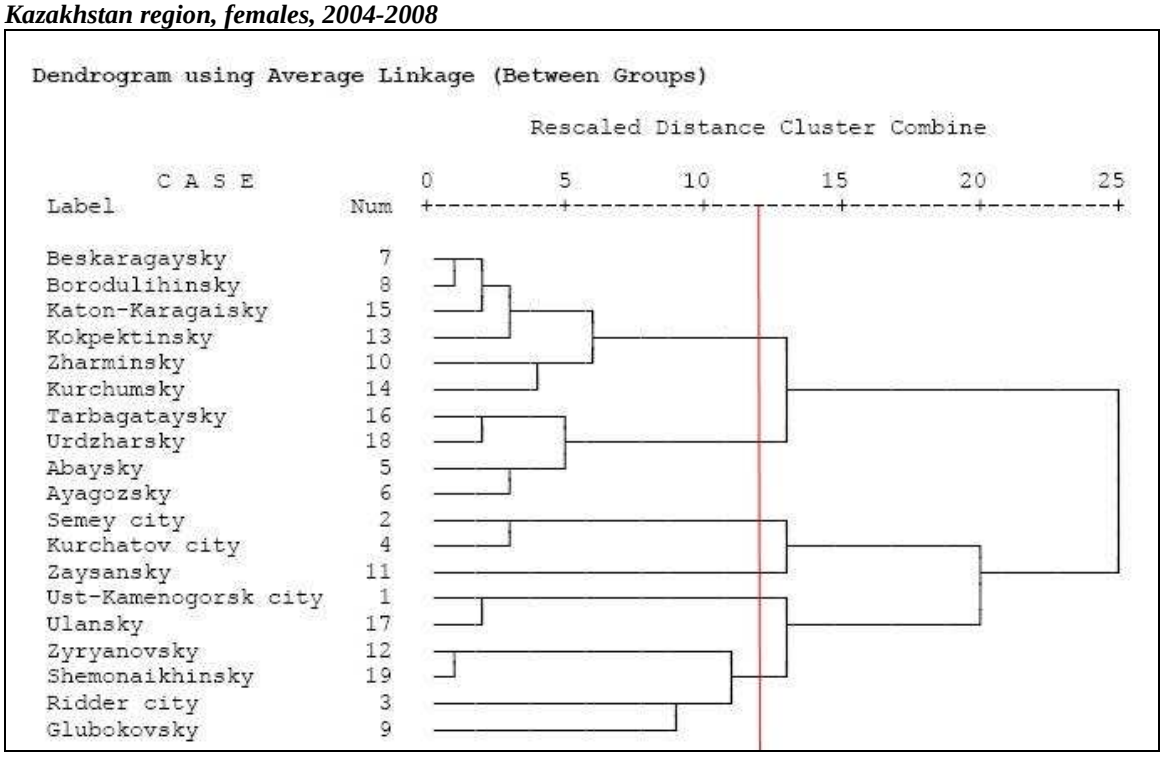
Fig. 31: Classification of districts by the role of migration in population size development, East Kazakhstan region, females, 1999-2003



Note: the red line is the level of cutting dendrogram into cluster groups

Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

Fig. 32: Classification of districts by the role of migration in population size development, East Kazakhstan region, females, 2004-2008



Note: the red line is the level of cutting dendrogram into cluster groups

Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

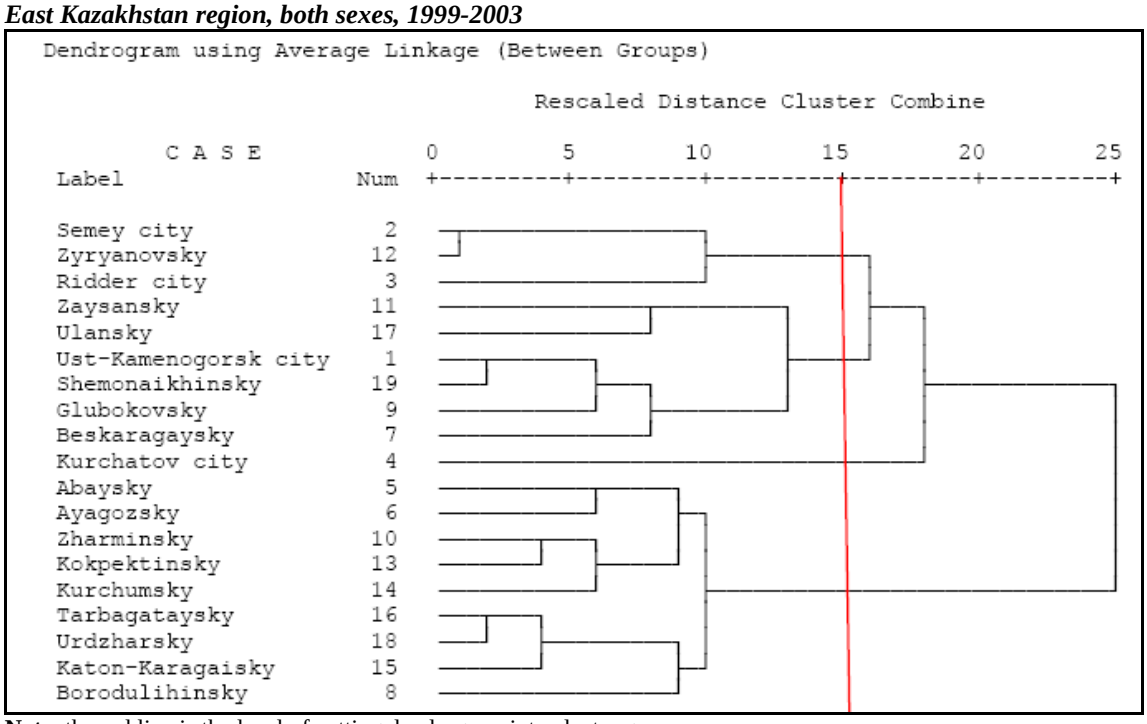
The memberships of the cluster groups for females were the following: in the first period of observation the first cluster members were Semey city, Kokpektinsky district, Ust-Kamenogorsk city and Zyryanovsky district, where the first one and the second one united between each other, and the other ones had no joining with anyone. The second cluster group members were Glubokovsky, Shemonaikhinsky, Borodulikhinsky, and Ulansky districts. In this cluster the first and the second one, the third and the fourth one united between each other. The third cluster of the first period included Tarbagataysky, Urdzharsky, Kurchumsky, Katon-Karagaisky, Beskaragaysky, Ayagozsky, and Zaysansky districts. In the third cluster Beskaragaysky district had no joining with other members of the cluster group. Tarbagataysky and Urdzharsky, Kurchumsky and Katon-Karagaisky, Ayagozsky and Zaysansky districts united among each other. The fourth cluster group memberships were Kurchumsky and Zharminsky districts which united between each other and Abaysky district, which had no union with others. Ridder city in the first period had its own separate cluster group. In the second period as we noted above the number of cluster groups increased. For females the distribution of districts by the role of migration in the population size development in the second period was the following: the first cluster groups included Beskaragaysky, Borodulikhinsky, Katon-Karagaisky, Kokpektinsky, Zharminsky, and Kurchumsky districts. The joining among them was the following: Beskaragaysky and Borodulikhinsky, Zharminsky and Kurchumsky. Katon-Karagaisky and Kokpektinsky districts did not unite with anyone. In the second cluster of the second period Tarbagataysky district united with Urdzharsky, and Abaysky district united with Ayagozsky district. In the third cluster Semey city and Kurchatov city united between each other. In the second period Zaysansky district set up its separate fourth cluster group. Ust-Kamenogorsk city and Ulansky district were in the fifth cluster in the second period. The sixth cluster memberships were Zyryanovsky districts, Shemonaikhinsky district, Ridder city, can Glubokovsky district, where the first member and the second one, the third one and the second one united between each other (Fig. 31, Fig. 32).

Distribution of the districts into cluster groups in 1999-2003 and 2004-2008 showed that in the first period in Tarbagataysky, Urdzharsky, Kurchumsky and Zharminsky districts the influence of migration for male and female population is more homogeneous than in other districts, since the unification of these districts for both sexes was identical. However, in the second period Zyryanovsky and Shemonaikhinsky districts joined the above mentioned districts. In other words, in these districts the migration behaviors of males and females are close to each other.

The age-specific intensity of migration among the districts is also different, and accordingly the impact of migration is different too. The districts were classified by the role of migration in development of population age and sex structure. As mentioned in methodological part of the paper, the estimating variables in the classification were given by the difference between age-specific net migration and mortality rates. The cutting tree at the level of 15 gave

the following results: in both periods there were 4 clusters from dendrogram for both sexes. The number of clusters for both sexes' dendrogram and membership of districts in these clusters between two periods changed. (Fig. 33, Fig. 34; Appendix 4, Fig. 1, Fig. 2; Appendix 5 Tab. 3, Tab. 4)

Fig. 33: Classification of districts by the role of migration in population age structure development, East Kazakhstan region, both sexes, 1999-2003



Note: the red line is the level of cutting dendrogram into cluster groups

Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

The members included in the first cluster of the first period - Semey city and Zyryanovsky district – united, but Ridder city did not join any of them. The first cluster was characterized by a lower impact of migration in all age groups except age group 15-19 years in comparison with other clusters. It can be assumed that this was due to the fact that these districts are industrial settlements distinguished by the high level of mortality. It means that this cluster could be defined as a group where mortality had more impact on formation of the age structure of population than migration. The feature of the first cluster was that influence of mortality on newborns and older people was higher than in other clusters. Mortality intensity increased in younger ages more than in other clusters (age group 30-34). There was an interesting fact that in Ridder city and Zyryanovsky district the proportion of older people was higher and the proportion of children is lower than in Semey city. Despite this fact there is no joining between of them. Probably joining of Semey city and Zyryanovsky district happened due to their migration intensity, since Semey city is one of the centers of the migration inflows, especially for Kazakhs and oralmans, while Zyryanovsky district is characterized by the migration outflows in

international migration as well as in internal migration (Fig. 33; Appendix 4, Fig. 1; Appendix 5, Tab. 3).

In the first period the second cluster features are: a) its members are industrial districts with high level of mortality and migration; b) old age structure of population; c) prevalence of European ethnic groups in ethnic composition of the population, excluding Ulansky and Beskaragaysky districts. In this cluster Glubokovsky and Beskaragaysky districts did not join any other districts, while Ust-Kamenogorsk city and Shemonaikhinsky district united. Among the age groups there is not any fluctuation, excluding age group 15-19 years, which is known for the highest intensity of migration (Fig. 33; Appendix 4, Fig. 1; Appendix 5, Tab. 3).

In the third cluster Shemonaikhinsky district joins Ust-Kamenogorsk city. Glubokovsky and Beskaragaysky districts have no connection with any other districts. In this group the influence of mortality on population begins from age group 45-49 years which is not presented in other clusters, excluding the first cluster where it begins in much younger age group. Excluding Ulansky and Beskaragaysky districts, the members of the cluster are industrial districts with high level mortality and migration, old population age structure and prevalence of European ethnic groups. The similarity of Ust-Kamenogorsk and Shemonaikhinsky district can be the result of their migration intensity by ethnic groups, since in these districts most of ethnic groups are Russians and Germans (Fig. 33; Appendix 4, Fig. 1; Appendix 5, Tab. 3).

The fourth cluster population is more influenced by migration than mortality, excluding age group of older people. It can be assumed that Kurchatov city is given in a separate cluster since its migration intensity is different from other districts in age group of newborns where migration played a more subtle role than mortality and the influence of migration in age group 20-24 years is higher than in other districts. It is a unique situation when migration played a more intensive role than mortality for development of newborns. Also in Kurchatov city migration and mortality intensities from age group 30-34 years fluctuated. It means that age group 30-39 years developed under the influence of mortality. Then age group 40-49 years developed under the impact of migration. The next two age groups (50-54 and 55-59 years) again developed under the impact of migration. Surely, in Kurchatov city it was a reason of immigration of oralmans, since they are known for a high level of natality, and mostly it is a family migration of oralmans with many newborns. Hypothetically, migration in Kurchatov city is different from migration in other districts. Since Kurchatov city is an industrial district with nuclear bomb testing history and because of this fact the population health is not good, this may be the cause of early mortality impact on population structure (Fig. 33; Appendix 4, Fig. 1; Appendix 5, Tab. 3).

The fifth cluster members were agricultural districts with prevalence of Kazakhs ethnic group in population ethnic structure, except Borodulikhinsky district where Russians were a prevalent ethnic group in ethnic composition of the population. The ethnic aspect is important since Kazakhs migrate with a high intensity in internal migration which is important nowadays

when emigration capacity of European ethnic groups is decreasing and emigration abroad is a more reasonable decision for migrants. The feature of this cluster is that migration intensity is higher in comparison with other clusters by all age groups and the influence of mortality begins from age group 55-59 years. It can be a reason of economic orientations of the members of these districts, since the mortality intensity in agricultural districts is lower than in industrial districts (Fig. 33; Appendix 4, Fig. 1; Appendix 5, Tab. 3).

This last cluster is a more interesting group with the highest number of members in comparison with other clusters. The following results can be seen: there are two big groups of districts which joined together the members of the first group are Abaysky, Ayagozsky, Zharminsky, Kokpektinsky, and Kurchumsky districts. The second one includes Tarbagataysky, Urdzharsky, Katon-Karagaisky, and Borodulikhinsky districts. In the first group of the fifth cluster Abaysky and Ayagozsky, Zharminsky and Kokpektinsky districts joined together, and Kurchumsky district stands separately. In the second group of the fifth cluster Tarbagataysky and Urdzharsky districts joined each other, and Katon-Karagaisky, and Borodulikhinsky districts are not connected with any other district. It means that migratory intensity of Abaysky and Ayagozsky districts, Zharminsky and Kokpektinsky districts, Tarbagataysky and Urdzharsky districts is similar. Kurchumsky, Katon-Karagaisky, and Borodulikhinsky districts have no similarity in migration intensity. Nevertheless, the impact of migration on the development of population structure is similar (Fig. 33; Appendix 4, Fig. 1; Appendix 5, Tab. 3).

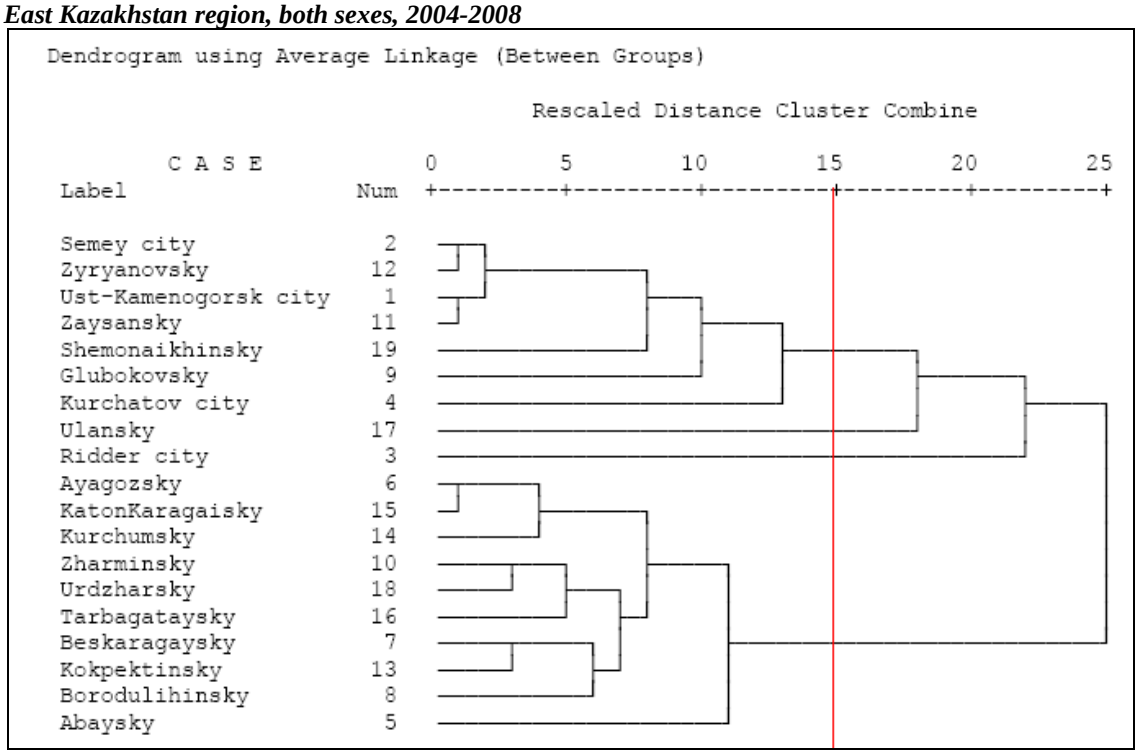
In the next period the joining of districts into clusters was the following: the members of the first and the second clusters joined into one cluster. From the first and the second cluster of the first period Ridder city and Ulansky district separated into their own two clusters. From the second cluster of the first period Beskaragaysky district entered the fourth cluster of the second period. In the second period in Ridder city the intensity of age-specific net migration rate decreased among all the age groups in the second period and the level of the difference between age-specific net migration and mortality rates decreased. Their values were not similar to other districts, and it was the reason for separation of Ridder city into its own cluster. For Ulansky district the reason is that the migration intensity among the age groups decreased. The result of this was the increase of the values of the difference between two rates in the oldest age group (85 years and over) and their decrease among the other age groups (Fig. 34; Appendix 4, Fig. 2; Appendix 5, Tab. 4).

In the second period the features of the clusters was the same as with the first period, the difference was only in age groups when mortality begins to play the role in development of population age structure. For the first cluster it was age group 45-49 years, for the second cluster – age group 30-34 years, for the third cluster – age group 25-29 years, for the fourth cluster – age group 55-59 years (Fig. 34; Appendix 4, Fig. 2; Appendix 5, Tab. 4).

Their joining depends on the intensity of migration and mortality in these districts. Mortality by age groups is not changing rapidly, and the cause of their joining mostly depends on the intensity of migration. Further, these joint districts were close to each other (Appendix 2,

Map 2). Consequently, if socio-economic development of the districts has a similar orientation and they are neighbors, their migration intensity will be similar and the role of migration in the development of the age structure of population will be also similar. In other words, in this case the cause of joining was due to geographical distribution of migration or spatial mobility, which means that the level of the role of migration in development of population age structure of neighbor districts is higher, than for the districts which are far from each other.

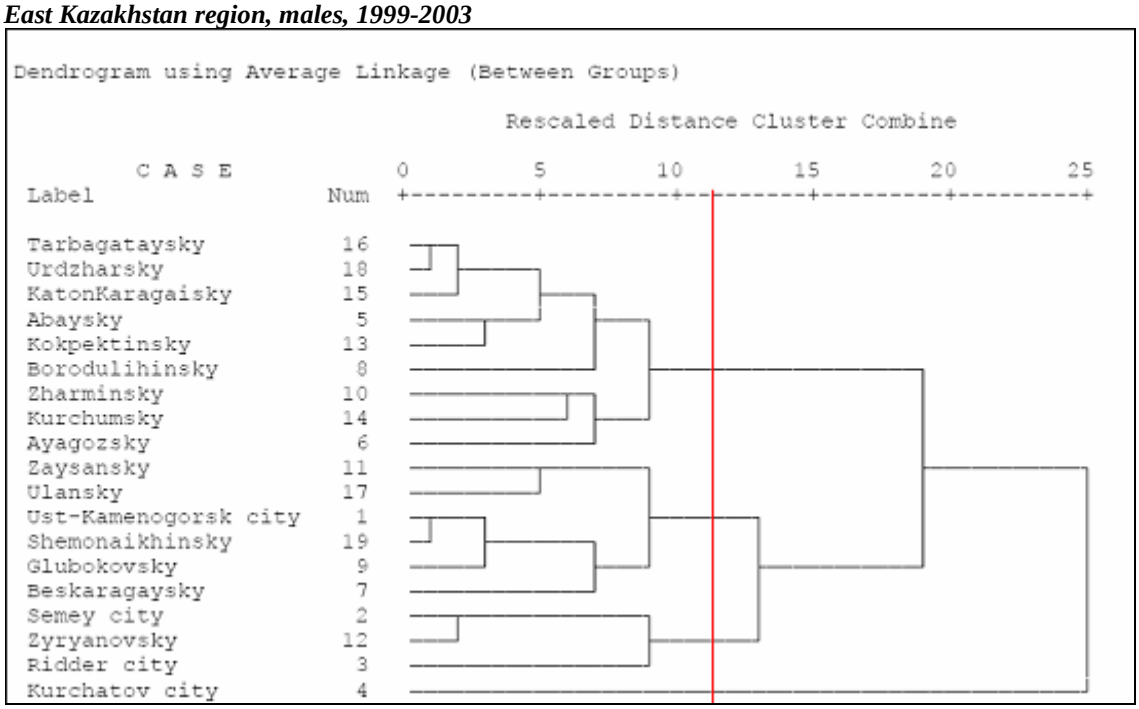
Fig. 34: Classification of districts by the role of migration in population age structure development, East Kazakhstan region, both sexes, 2004-2008



Note: the red line is the level of cutting dendrogram into cluster groups

Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

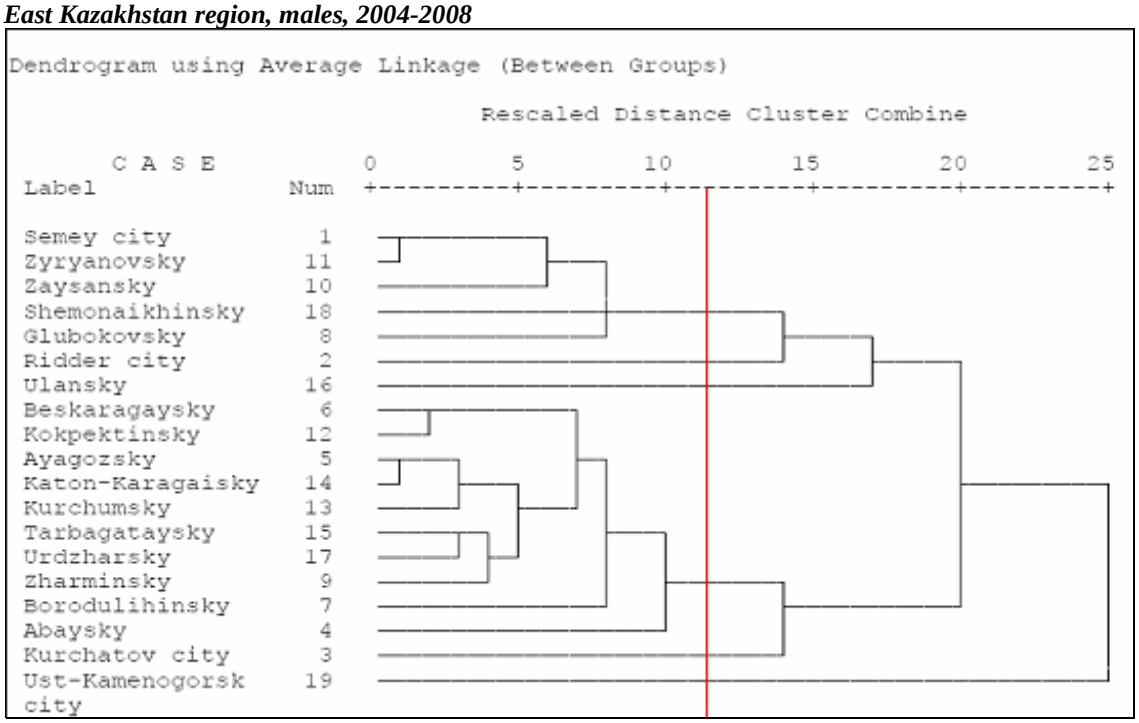
Fig. 35: Classification of districts by the role of migration in population age structure development, East Kazakhstan region, males, 1999-2003



Note: the red line is the level of cutting dendrogram into cluster groups

Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

Fig. 36: Classification of districts by the role of migration in population age structure development, East Kazakhstan region, males, 2004-2008



Note: the red line is the level of cutting dendrogram into cluster groups

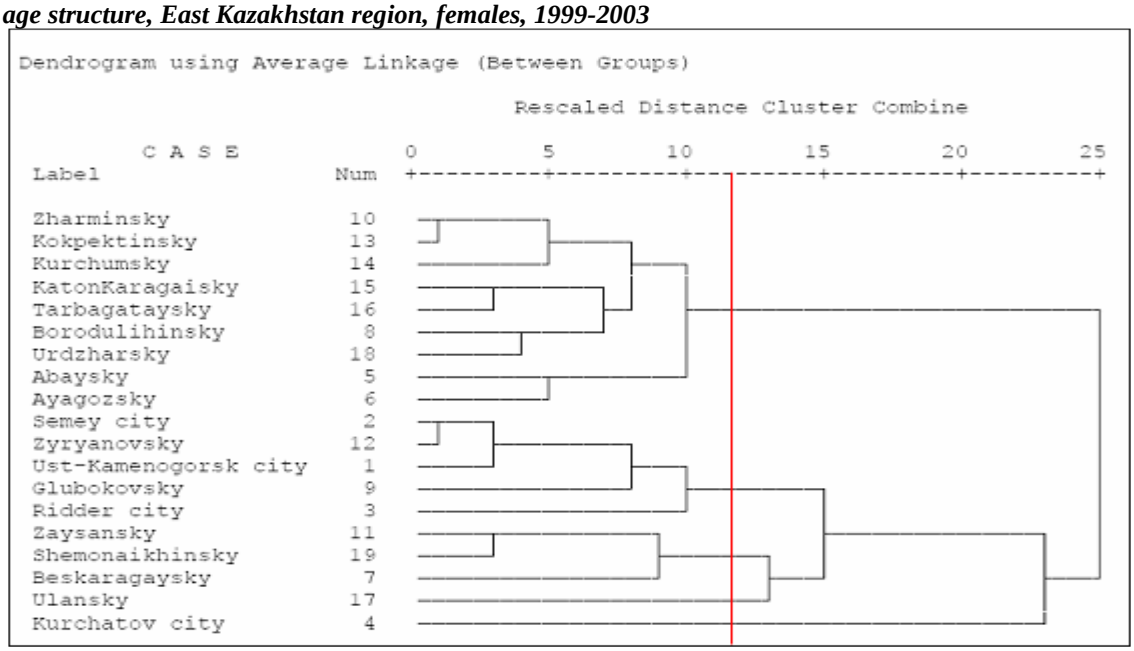
Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

As it was noted above, migration is age and sex selective process. Based on this, the classification of districts according to the role of migration in development of population age structure by sex for males and females was made separately. However, the main causes of population movement and the reason of joining are similar for both sexes. Cutting of the dendrogram at level 11 gave four clusters in the first period and six clusters in the second period for males. Five clusters for females in both periods. Memberships of districts of these clusters were changed for males as well as for females in both periods. The first cluster for males included nine districts in 1999-2003. In the first cluster of the first period Tarbagataysky and Urdzharsky, Abaysky and Kokpektinsky, Zharminsky and Kurchumsky districts were similar for males. Katon-Karagaisky, Borodulikhinsky, Ayagozsky districts did not have any connection with others. In this cluster the influence of mortality began from age group 50-54 years. The impact of migration in age group 1-49 years was higher in comparison with other clusters. Consequently, age structure of males in this cluster developed mostly under the influence of migration. The second cluster of the first period for males included six districts where Glubokovsky and Beskaragaysky districts did not join any other district. Zaysansky and Ulansky districts, Ust-Kamenogorsk city and Shemonaikhinsky district joined together. In the second cluster the impact of mortality on the development of males' age structure began from age group 40-44 years. Semey city, Zyryanovsky district and Ridder city were the members of the third cluster, where the last one had no connection with other districts, and Semey city and Zyryanovsky district had a combination. In the third cluster mortality impact on formation of the groups of population age structure began from age group 25-29 years for males. It means that the age structure for males in this cluster developed under the influence of mortality. The high level of males' mortality in young ages could be related to heavy industry in these districts, since Ridder city and Zyryanovsky district as well as Semey city are centers of polymetal and heavy industry. Kurchatov city corresponds with a separate fourth cluster in 1999-2003 and 2004-2008. The role of migration for males' age structure played a more important role than migration in age groups 0-29, 35-39, and 45-54 years in Kurchatov city. These fluctuations in males' age-specific net migration and mortality rates could be explained by the fact that migration patterns in this city were different from other districts (Fig. 35, Fig. 36; Appendix 4, Fig. 3, Fig. 4; Appendix 5, Tab. 5, Tab. 6).

In 2004-2008 migration intensity of males decreased and it could be a reason of entering two additional clusters. Members of the first cluster were Semey city, Zyryanovsky, Zaysansky, Shemonaikhinsky districts, where only the first and the second one join, and others did not have any combination with each other. Ridder city and Ulansky district had two separate clusters. In the second period the fourth cluster members were the same with members of the first cluster of the first period, but Beskaragaysky district moved into this cluster. Kurchatov and Ust-Kamenogorsk cities were represented in separate clusters. The separation of Ust-Kamenogorsk was probably due to the fact that males' mortality in the district is high, especially from age group 40 years and

over. Decrease of the migration intensity made Ust-Kamenogorsk moved to a separate cluster. Moreover, the age of mortality influence begins from age group 25-29 years (Fig. 35, Fig. 36; Appendix 4, Fig. 3, Fig. 4; Appendix 5, Tab. 5, Tab. 6).

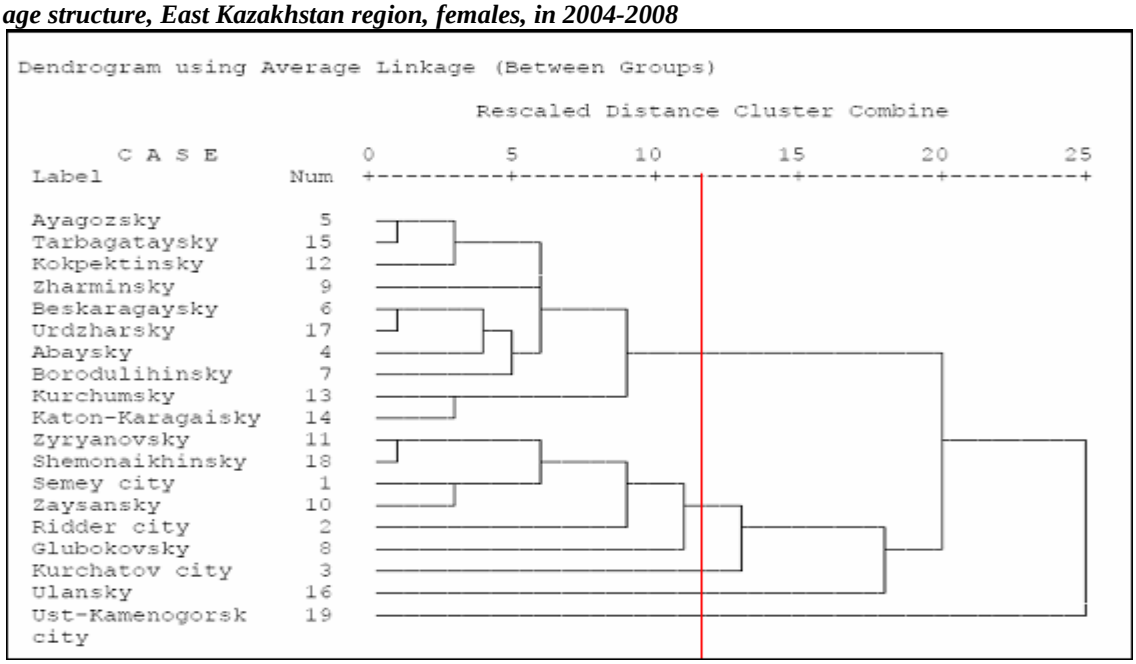
Fig. 37: Dendrogram of classification of districts by the role of migration in development population age structure, East Kazakhstan region, females, 1999-2003



Note: the red line is the level of cutting dendrogram into cluster groups

Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

Fig. 38: Dendrogram of classification of districts by the role of migration in development population age structure, East Kazakhstan region, females, in 2004-2008



Note: the red line is the level of cutting dendrogram into cluster groups

Source: Author's calculation based on data of the Agency of Statistics of the Republic of Kazakhstan

Females had higher migration intensity than males, and females' mortality intensity by age was also different from males' age-specific mortality. Hypothetically, the members in clusters for females are different from the members in clusters for males. In 1999-2003 the first cluster members were Zharminsky, Kokpektinsky, Kurchumsky, Katon-Karagaisky, Tarbagataysky, Borodulikhinsky, Abaysky, Urdzharsky and Ayagozsky districts. In the second period the first cluster was completed with Beskaragaysky district and other members remained in the same composition. In 1999-2003 in the first cluster mortality played a more important role in age group 65-69 years and in 2004-2008 − in age group 55-59 years. It can be assumed that Beskaragaysky district was the cause of rejuvenating the role of mortality in the development of sex-age structure of population of the first cluster in the second estimated period, since in Beskaragaysky district the proportion of older people was bigger than for other members of this cluster. From the age profile of the influence of migration we can say that this cluster was known as a cluster which was more developed under the influence of migration than mortality (Fig. 37, Fig. 38; Appendix 4, Fig. 5, Fig. 6; Appendix 5, Tab. 7, Tab. 8).

The second cluster included Zyryanovsky and Shemonaikhinsky districts, Semey city, Zaysansky districts, Ridder city, and Glubokovsky district in 1999-2003. Ust-Kamenogorsk city was included in this cluster and Zaysansky and Shemonaikhinsky districts were out of this cluster and formed the third cluster with Beskaragaysky district in the second period. In the second cluster age-specific mortality intensity began to exceed migration intensity by age from age group 45-49 years in 1999-2003 and from age group 50-54 years in 2004-2008 (Fig. 37, Fig. 38; Appendix 4, Fig. 5, Fig. 6; Appendix 5, Tab. 7, Tab. 8).

Ulansky district and Kurchatov city had separate clusters in the first and the second period. It can be assumed that Ulansky district had its own cluster since migration played a more important role in formation of age groups for newborns (which is an irregular situation) and mortality influence began in older ages than in other clusters (age group 65-69 years). It can be concluded that Ulasnky district is developed under the influence of migration purely. For the cluster of Kurchatov city the causes are described above. In the second period Ust-Kamenogorsk city has its own cluster for development evaluation of females' age structure (Fig. 37, Fig. 38; Appendix 4, Fig. 5, Fig. 6; Appendix 5, Tab. 7, Tab. 8).

After 2008 generation of the 1990's will enter into the reproductive age. They are the generation of market relations, as we know nowadays the market and its laws influence the demographic behavior of the population in developed countries. Each new generation is more educated and they are much closer to innovations and to western style of life, which is known for its low level of fertility and developed individual interest, etc. Looking at the growth of cities and urbanization processes, big natural increase cannot be expected. It is very important to keep the generation of the 1980's and stimulate them to childbearing, because they are not so far from traditional thinking as the new generation of the 1990s. The intensive rural urban migration which takes place and develops every year in the region will be changing their fertility attitude. It is an

indirect influence of migration on population change because industrial, urban society makes over demographic (reproductive) attitude of population (Alekseenko, 2004:33-41).

The East Kazakhstan region is an ecologically polluted, industrial region, where the basic source of income is metallurgy and industry and that negatively influences health. The atomic bursts which took place from 1940s till the end of the 1980s in Semey city and in their adjacent districts influenced population health and later health of posterities. Ust-Kamenogorsk city, Ridder city, Zyryanovsky and Shemonaikhinsky districts and others are heavy industry centers and they have polluted environment. All of these aspects affect the level of mortality in the districts. These ecological problems forced people to move out from these regions and the result of it can be presented by age-specific net migration and mortality intensities.

In this part of the research of the role of migration in development of population size and age-sex structure were considered. The main findings were that the population size of the region and its urban and rural settlements developed under the influence of migration. In urban settlements the impact of migration on the formation of sex-age structure finished at younger ages than in rural settlements. It was due to the fact that firstly, migration intensity of the population after the age group 40-44 years declined, and secondly, mortality from this age group gathered more speed in its intensity, especially for males in urban settlements. The evaluation of the role of migration at the level of districts was made by cluster analysis.

Conclusions

The role of migration in the population development is one of the important questions in current demographic development not only in a single country, but in the whole world. This work evaluates the role of migration in the development of the size and age-sex structure of the population in the East-Kazakhstan region of the Republic of Kazakhstan in 1999-2008. Besides, the method of statistical cluster analysis was applied to define the groups of districts according to the similarity of the migration role in the development of the size and age-sex structure of the population. In this work the role of migration in the development of the population size was evaluated on the background natural change of the population, and the role of migration in the development of sex-age structure was assessed on the background of the level of mortality in particular age groups.

Findings derived from analyses of the demographic development in the region and its subdivisions in combination with evaluating the role of migration in population development, based on the central research questions and hypotheses of this paper are presented below.

a) What was the population development (development of population size, sex and age structure) in the region and its urban and rural settlements, and particular districts during the given period? In the region population declined to 7.5 per cent in 1999-2008. Population decline in the region was caused by negative net migration and negative natural change. The levels of development index showed that the population decline in the rural areas was more intensive than in the urban areas (in urban areas population declined to 5.6 per cent, in rural areas − to 8.2 per cent). It was caused mostly by high intensity of rural-urban migration, since the natural change in rural areas is positive. Concerning the development of population age structure we conclude that the proportion of children decreased, while the proportion of working age group and people older than 65 increased in the region as a whole and in its urban and rural settlements. The proportion of males was higher than females' proportion in the age group of children and persons in the productive age or in our case working age population (age group 15-64 years). However, the proportion of females in the age group of people older than 65 twice exceeded males' proportion in the same age group due to the fact that males older than 65 have higher mortality intensity than females in the same age groups (Sheriyazdanova, 2004:326-334). This trend is applicable for urban and rural settlements of the region too.

The population development at the level of districts showed that only Semey city and Kurchatov city have positive population change, whereas, in other districts the population declined. In all the districts the proportions of children declined, the proportion of working age population and people older than 65 increased. In the industrial districts with prevalence of urban population and European ethnic groups in population ethnic composition (as Ust-Kamenogorsk, Ridder, Kurchatov, Semey cities, Shemonaikhinsky, Zaysansky, Borodulihinsky, Glubokovsky, and Zyryanovsky districts) the proportion of children was lower and the proportion of working age population was higher in comparison with the rural and agricultural districts with prevalence of Kazakhs in the population ethnic structure (as Abaysky, Ayagozsky, Beskaragaysky, Katon-Karagaisky, Kokpektinsky, Kurchumsky, Ulansky, Urdzharsky, Tarbagataysky, and Zharminsky districts).

b) What was the role of migration in the development of population size, sex and age structure in the region and its urban and rural settlements, and particular districts during the given period? The comparison of the values of natural change and net migration rate showed that in the development of the population size migration played a more significant role than natural change. Because the value of net migration rate ten times exceeded the value of natural change rate. It is applicable for urban and rural settlements of the region. In the first five-six years of the observation the impact of migration on the development of males' population was higher than females' one. Increase of males' intensity of natural change rate, decrease of males' migration intensity, and also increase of females' migration intensity after 2003 led to the fact that migration began to have a stronger impact on the development of females' population size than of males' one. The migration intensity in rural areas was higher than in urban areas. In compliance with this we conclude that for the population development in rural areas migration influence was higher than in urban areas. Migration intensity of rural females prevailed over rural males', urban males' and urban females' migration intensity. From this we conclude that rural females' population change was more exposed to changing due to migration. The fact that migration intensity of females exceeded males' one led to the trend called "feminization of migration". The trend "feminization of migration" is now one of the wide-spread phenomena in the world migration (Martin, 2003). Besides, the increase of females' migration intensity at reproductive age can have a negative impact on the development of the natality level in the region.

The most significant role of migration in the population age structure was in the age group 5-34 years for the total population, in the age group 5-39 years for females, for males it was in age group 5-29 years. The age groups 1-39 years in urban areas and 1-44 years in rural areas developed under the impact of migration mostly. The highest impact of migration was observed in the age group 15-29 years in the whole region, in the age group 15-24 years in rural areas, and in the age group 20-29 years in urban areas. The intensity of migration in the age group of children depends on migration intensity of their parents who are usually in the age

group 25-49 years. The increase of migration intensity in the age group 25-49 years leads to the increase of children's migration intensity and migration has a crucial impact on the development of children age group. The level of the ratio between age-specific net migration and mortality rates at the young working age group (aged 15-29 years) for females were higher than for males. It appears from this that the development of female' population at the young working age group (aged 15-29 years) was more exposed to migration impact than of males' one. As the ratio between age-specific net migration and mortality rates showed, in urban settlements the impact of migration on the development of age structure completes earlier than in rural ones. Year by year the age of completion of the migration influence in both types of settlements is rejuvenating.

The result of hierarchical cluster analysis presented that the population size in Glubokovsky, Zyryanovsky districts, and Ridder city developed more under the impact of natural change than migration. In these districts the impact of mortality on the development of the population age structure began earlier than in other districts, especially for males' population. The population size in Abaysky, Ayagozsky, Kurchumsky, Zharminsky, Katon-Karagaisky, Kokpektinsky, Borodulikhinsky and Beskaragaysky districts, Ust-Kamenogorsk city, Ulansky, Tarbagataysky, Urdzharsky, Shemonaikhinsky, and Zaysansky districts developed more under the impact of migration than natural change. The population in Semey and Kurchatov cities developed under the influence of natural growth as well as migration at equal level. The impact of migration on the development of the population age structure at the level of districts showed that Kurchatov city had a special migration impact on population age structure development. The impact of migration on newborns was found in Kurchatov city. This is a unique situation in the distribution of migration influence by age, since usually natality and mortality play main roles in the formation of the age group of newborns. In such industrial districts as Semey, Ridder, Ust-Kamenogorsk, Kurchatov cities and Glubokovsky and Shemonaikhinsky districts the influence of migration on the development of age structure of the population completed in age group 30-44 years. In other rural districts the influence of migration completed in age group 50 years and over.

c) Are there any districts similar by the migration role in the development of population size, age and sex structure? The results of cluster analysis showed that the factors, influencing the unification of the districts into cluster groups can be subdivided into the following groups: a) the levels of net migration and natural growth and also age-specific net migration and mortality rates; b) ethnic composition of the district; c) proportion of urban and rural population in the districts; d) economic orientation of the district (industrial or agricultural); e) geographical location of the districts. Besides, the following regularities in the distribution of the districts into cluster groups were discovered: The unification of the districts in one cluster group was made according to the first factor (the levels of net migration and natural growth and also age-specific net migration and mortality rates). However, the detailed consideration of the ethnic structure of

the population and the proportion of urban and rural population in the cluster members showed that the districts with identical or similar ethnic composition turned out to be more homogeneous groups. That is the districts with prevailing European ethnic groups (the Russians, the Germans, and the Ukrainians) in the population structure or the districts where the Kazakhs lived were grouped in the same clusters. Since most population of European ethnics lives in urban settlements, correspondingly, the distribution of the districts into clusters was made in accordance with the type of settlements. As industrial districts are located mostly in the regions with prevalence of urban settlements, the interrelation of economic orientation in the districts is obvious. That is the grouped districts had more or less identical economic orientations. Geographical location of the districts also had an important role in the intensity of migration. In the neighboring districts the demographic behavior is similar, and in this connection the intensity of migration in such districts is approximately similar. The composition of the cluster members proved it. So, in the sub periods 1999-2003 and 2004-2008 Tarbagataysky and Urdzharsky, Ayagozsky and Abaysky districts most often were in the same cluster.

Finally, it should be noted, the given above finding showed that our hypothesis was correct. It means that: 1) Migration in the region and its urban and rural settlements, particular districts (excluding, Glubokovsky and Zyryanovsky districts, Ridder city) has a stronger influence on the changes of population size than natural change of population during the given period. 2) Impact of migration on age structure of population in the districts with prevalence of urban population completed earlier, than in the districts with prevalence of urban population rural areas. The impact of migration on the development of females increased due to increasing the migration intensity of women. 3) The districts with similar proportion of urban and rural population, ethnic composition, and economic orientation have similar impact of migration on population size, age and sex structure development. It was proved by the classification of the districts into cluster groups.

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APPENDIX 1

Fig. 1: The statistical record cards attached to the arrival/departure form in Kazakhstan

THE STATISTICAL RECORD CARDS ATTACHED TO THE ARRIVAL/DEPARTURE FORM
Name, surname of the person, filling in the card_____
Citizenship_____

	Place of arrival (place arriving from)	Place of departure (place leaving to);
Country	Kazakhstan	
Region/city		
District/city		
City, district as administrative area		
Township/village		

It is recorded for whole family including a person responsible for filling in
Total number of arrivals _____, including children till 16 age old_____

Name	Sex	Month of birth	Year of birth	Nationality	Code					
					A	B	C	D	E	F

Sections A to F for persons arriving;
Sections A to E for persons leaving;
A - Social category (employees hired or contracted, employers, workers on own account, unemployed persons, etc.);
B - Purpose of travel (for permanent residence, for a contract of employment, in connection with study, etc.);
C - Level of education (higher, incomplete higher, specialized secondary, general secondary, incomplete secondary);
D - Specialty by education (architecture or building, medical, teaching, technical, economic, legal, farming, etc.);
E - Marital status (never married, married, widowed, divorced);
F - Status of persons arriving (refugee, repatriating refugee, immigrant).
Date of removal from register "___"_____ 20___
A person responsible for filling in _____
/signature/
information is checked and institutionalized by _____

Source: http://www.unece.org/stats/documents/2001/05/migration/2.add.10.e.pdf

Fig. 2: The statistical record cards attached to the arrival/departure form in Kazakhstan (other side)

(The reverse side of statistical record card)

RULES OF FILL IN OF THE STATISTICAL RECORD CARD

In "Name", "Citizenship", "Place of the departure", " Place of the arrival" is signed by the person who is responsible for fill in for all members of the family. Other questions are for all arrivals. In graphs A B C D E F fill in following codes:

A - Social category:

1. Wage earner (employees hired or contracted)
2. Employers
3. Workers on own account
4. Unemployed persons
5. Others (pensioners, students, pupils, housewives, etc.)

B - Purpose of travel

6. For permanent residence
7. For a contract of employment
8. In connection with study

Other

C - Level of education

9. Higher
10. Incomplete higher
11. Specialized secondary
12. General secondary
13. Incomplete secondary

D - Specialty by education

14. Architecture or building
15. Medical
16. Teaching
17. Technical
18. Economic
19. Legal
20. Farming,
21. Other

E - Marital status

22. Never married
23. Married
24. Widowed
25. Divorced

F - Status of persons arriving

Refugee
Repatriating refugee
Immigrant

Source: http://www.unece.org/stats/documents/2001/05/migration/2.add.10.e.pdf

Fig. 3: The statistical record cards attached to the arrival/departure form in Kazakhstan (in Russian-original)

ТАЛОН СТАТИСТИЧЕСКОГО УЧЕТА К ЛИСТКУ ПРИБЫТИЯ

Ф.И.О. лица, заполнившего талон_____
Гражданство_____

	Место прибытия	Откуда прибыл
Страна	Республика Казахстан	
Область/город		
Район/город		
Город, рай. под./адм. округ		
Поселок/село/аул		

Заполняется на всю семью, включая ответственного за заполнение

Количество прибывших, всего _____, в т.ч. детей
до 16 лет_____

Имя	Пол	Месяц рож-дения	Год рож-дения	Нацио-наль-ность	Код графы					
					А	Б	В	Г	Д	Е

А - Общественная категория
Б - Цель прибытия
В - Уровень образования
Г - Специальность по образованию
Д - Состояние в браке
Е - Статус (только для прибывших из-за пределов республики)

Дата регистрации "__"_____ 20___года
Ответственный за заполнение_____
/подпись/

Сведения проверил и регистрацию оформил_____
/подпись/

Source: http://www.unece.org/stats/documents/2001/05/migration/2.add.10.e.pdf

Fig. 4: The statistical record cards attached to the arrival/departure form in Kazakhstan (in Russian-original, other side)

(оборотная сторона статистического талона)

ПРАВИЛА ЗАПОЛНЕНИЯ СТАТИСТИЧЕСКОГО ТАЛОНА ПРИБЫТИЯ

В позициях "Ф.И.О.", "Гражданство", "Место прибытия", "Откуда прибыл" проставляются данные лица, ответственного за заполнение всех членов семьи. Остальные вопросы относятся ко всем прибывшим (включая ответственного за заполнение). В графах А, Б, В, Г, Д, Е проставляются соответствующие коды:

А) Общественная категория:
Наемные работники (работающие по трудовому договору/соглашению) 1
Работодатели (работники, которые нанимают наемных работников) 2
Лица, работающие за свой счет (индивидуальный труд) 3
Безработные 4
Другие (пенсионеры, студенты, учащиеся, домохозяйки, пр.) 5

Б) Цель прибытия (причины перемены места жительства):
На постоянное место жительства 1
По трудовому соглашению 2
В связи с учебой 3
Другие 4

В) Уровень образования:
Высшее 1
Незаконченное высшее 2
Среднее специальное 3
Среднее общее 4
Неполное среднее 5

Г) Специальность по образованию:
Архитектурно-строительное 1
Медицинское 2
Педагогическое 3
Технологическое 4
Экономическое 5
Юридическое 6
Сельскохозяйственное 7
Другое 8

Д) Состояние в браке:
Никогда не состоял (а) в браке 1
Состоит в браке 2
Вдова/вдовец 3
Разведен (а) 4

Е) Статус прибывших:
(заполняют только прибывшим из-за пределов республики)
Беженец 1
Беженец-репатриант 2
Иммигрант 3

Source: http://www.unece.org/stats/documents/2001/05/migration/2.add.10.e.pdf

APPENDIX 2

Map 1: Location of the East Kazakhstan region on the map of Kazakhstan

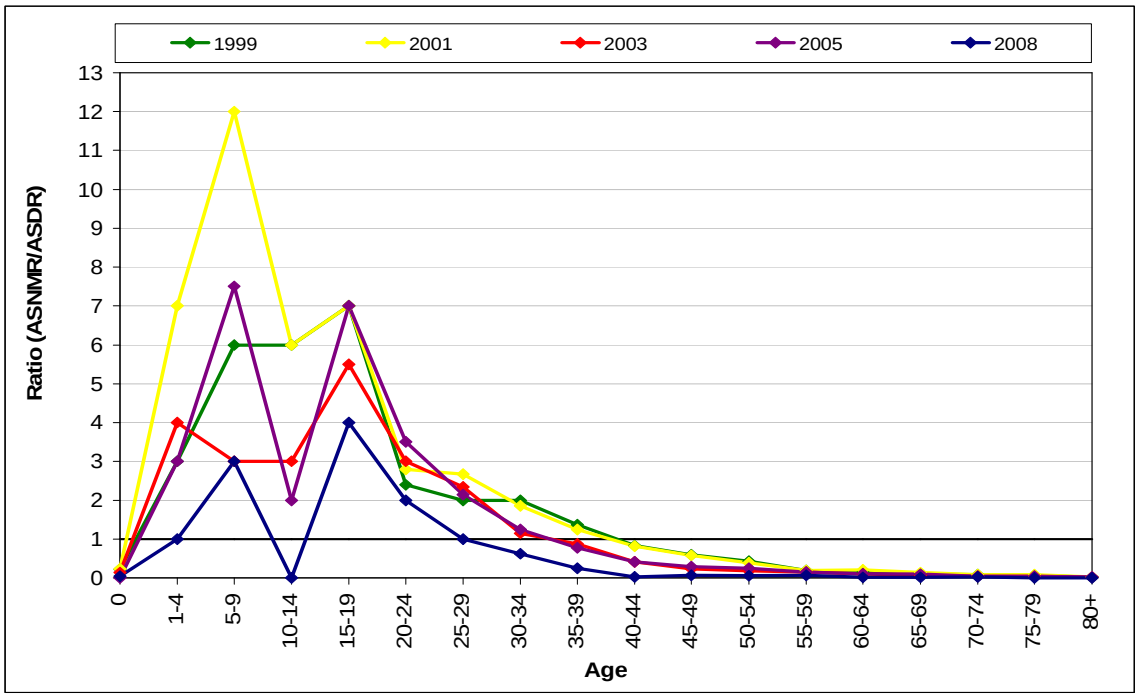
Source: http://www.lib.utexas.edu/maps/commonwealth/kazakhstan_pol01.jpg

Map 2: Administrative units of the East Kazakhstan region

Source: http://www.akimvko.gov.kz/eng/region2.htm (adjusted)

APPENDIX 3

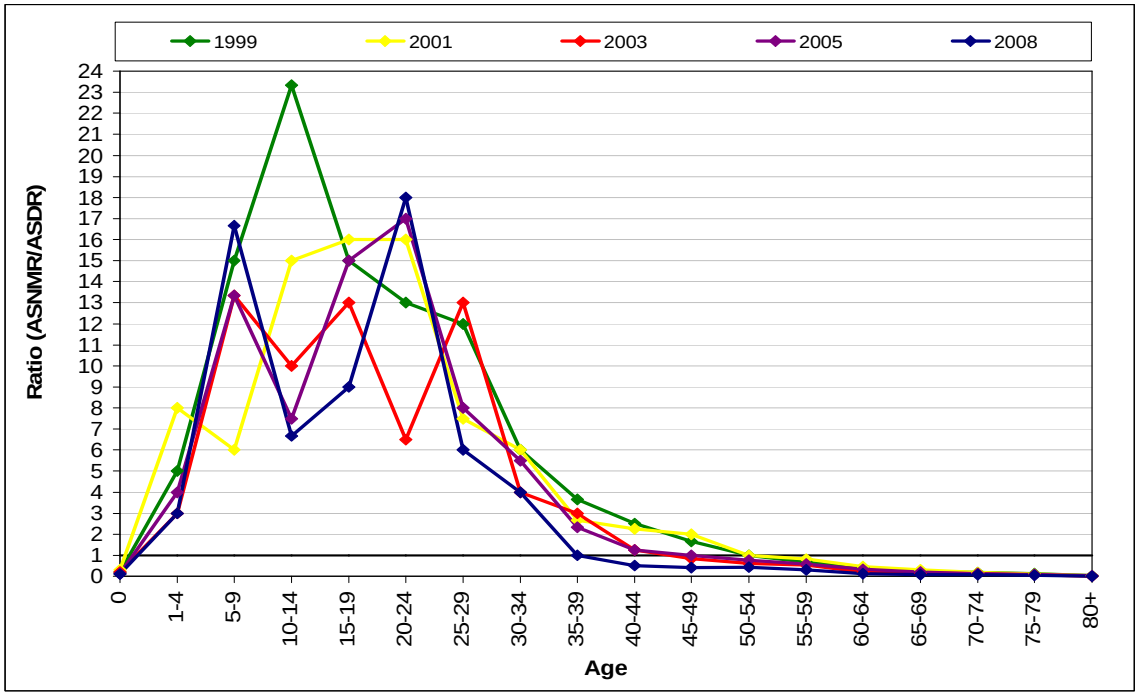
Fig. 1: The role of migration in population age structure development, East Kazakhstan region, males, 1999, 2001, 2003, 2005 and 2008



Note: *ASNMR* is age-specific net migration rate; *ASDR* is age-specific death rate

Source: Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

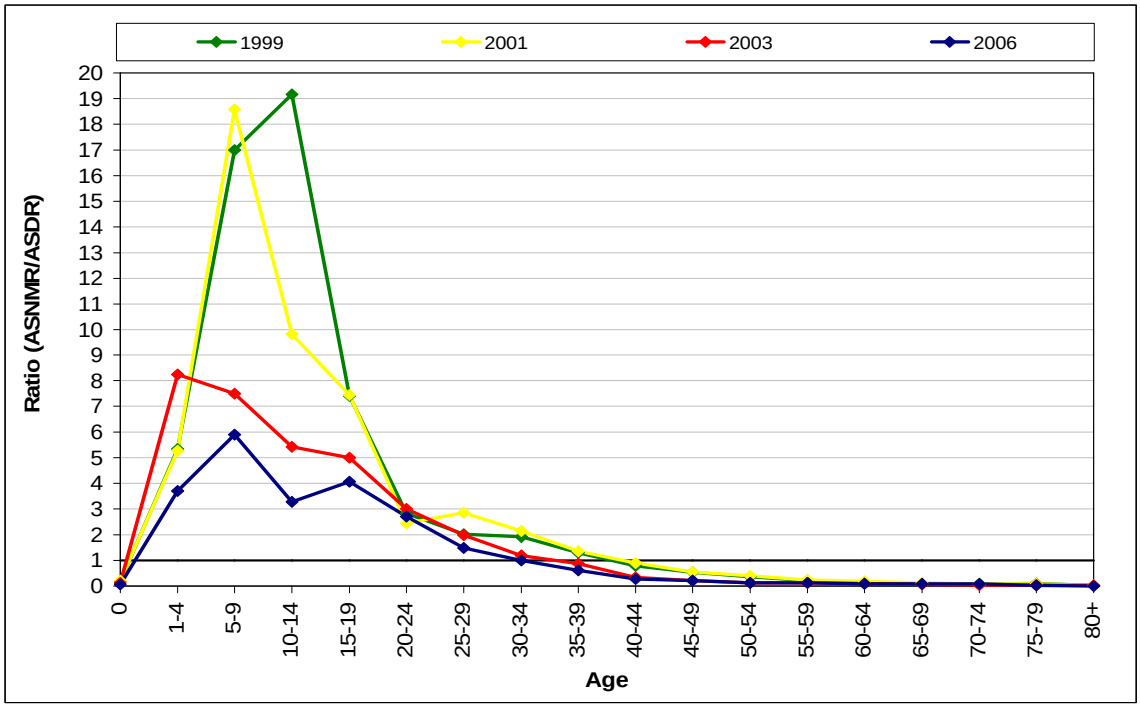
Fig. 2: The role of migration in population age structure development, East Kazakhstan region, females, 1999, 2001, 2003, 2005 and 2008



Note: *ASNMR* is age-specific net migration rate; *ASDR* is age-specific death rate

Source: Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

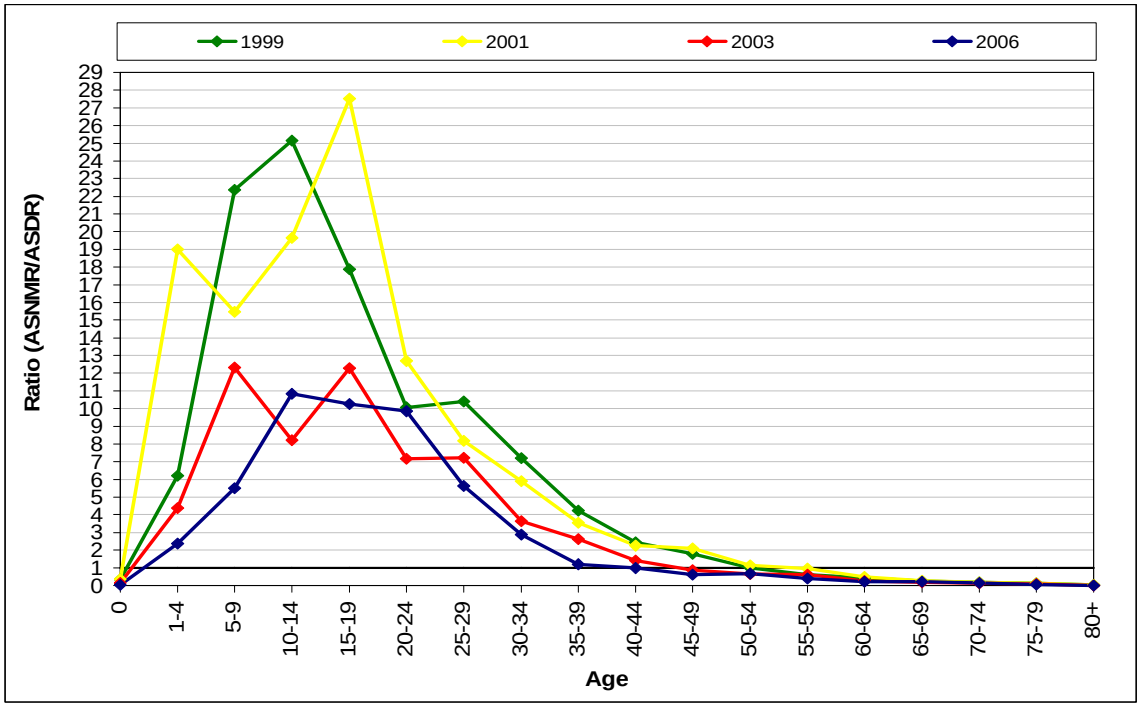
Fig. 3: The role of migration in population age structure development in urban settlement, East Kazakhstan region, males, 1999, 2001, 2003, and 2006



Note: *ASNMR* is age-specific net migration rate; *ASDR* is age-specific death rate

Source: Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

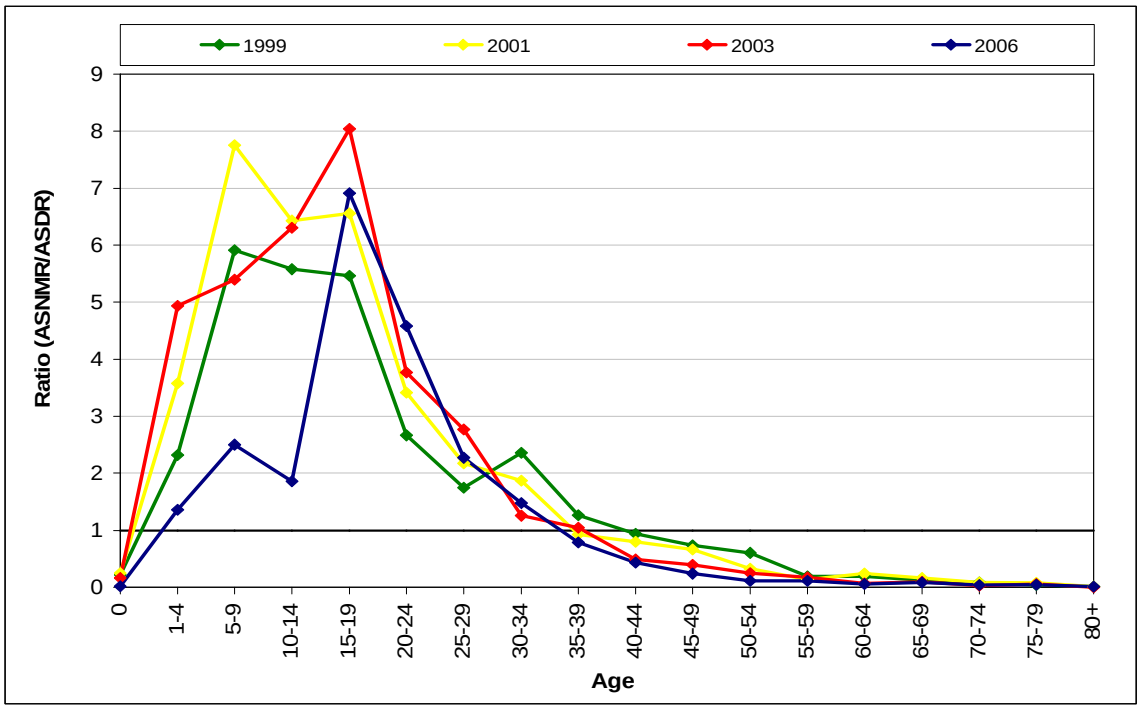
Fig. 4: The role of migration in population age structure development in urban settlement, East Kazakhstan region, females, 1999, 2001, 2003, and 2006



Note: *ASNMR* is age-specific net migration rate; *ASDR* is age-specific death rate

Source: Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

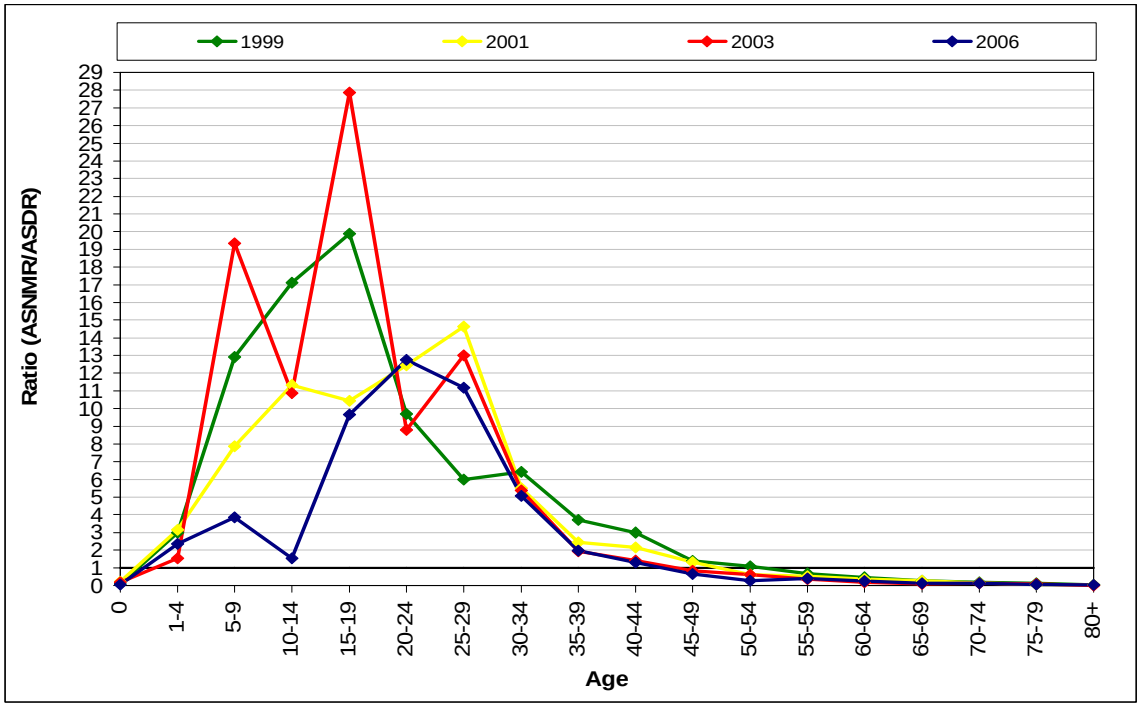
Fig. 5: The role of migration in population age structure development in rural settlement, East Kazakhstan region, males, 1999, 2001, 2003, and 2006



Note: *ASNMR* is age-specific net migration rate; *ASDR* is age-specific death rate

Source: Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

Fig. 6: The role of migration in population age structure development in rural settlement, East Kazakhstan region, females, 1999, 2001, 2003, and 2006

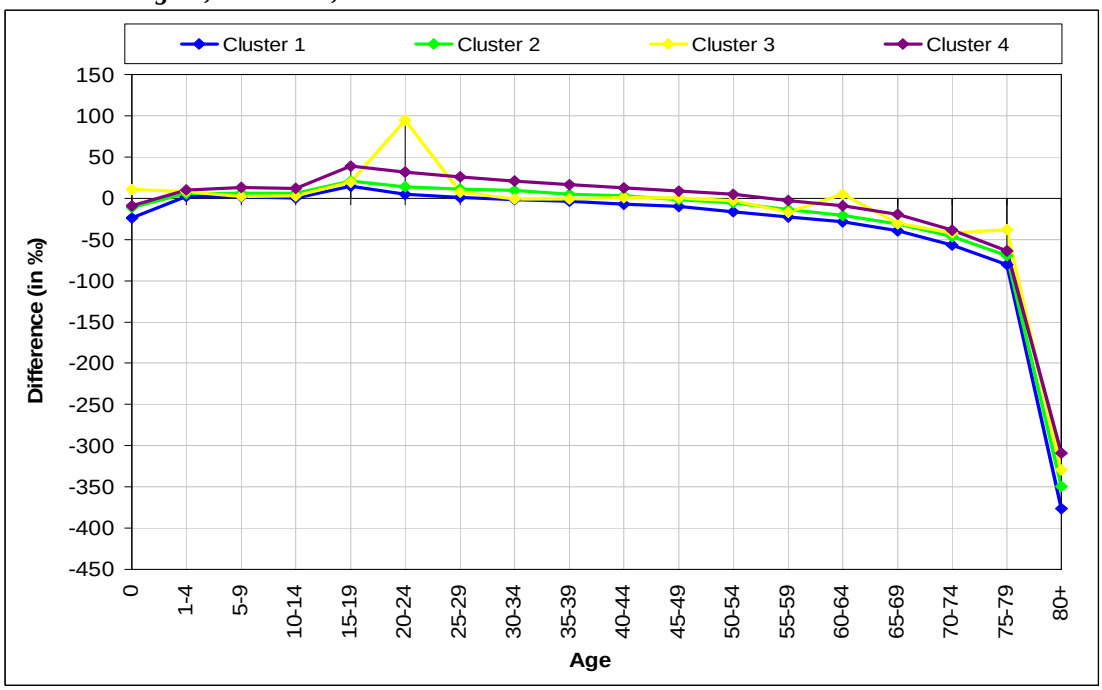


Note: *ASNMR* is age-specific net migration rate; *ASDR* is age-specific death rate

Source: Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

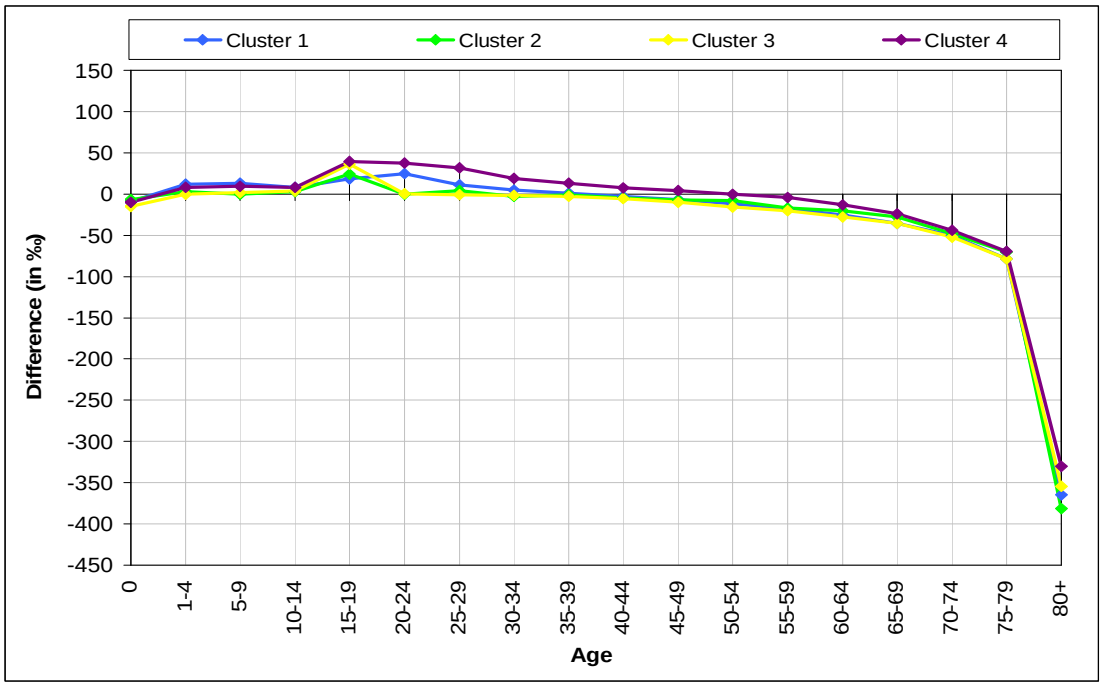
APPENDIX 4

Fig. 1: The role of migration in development of population age structure by clusters of districts, East Kazakhstan region, both sexes, 1999-2003



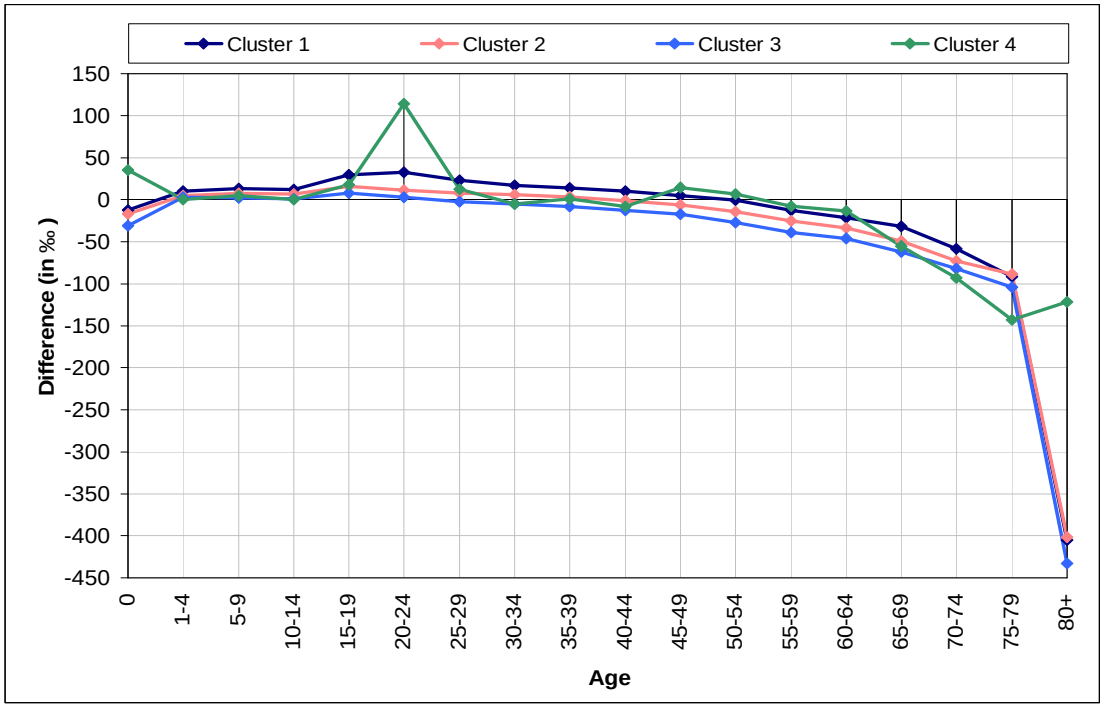
Source: Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

Fig. 2: The role of migration in development of population age structure by clusters of districts, East Kazakhstan region, both sexes, 2004-2008



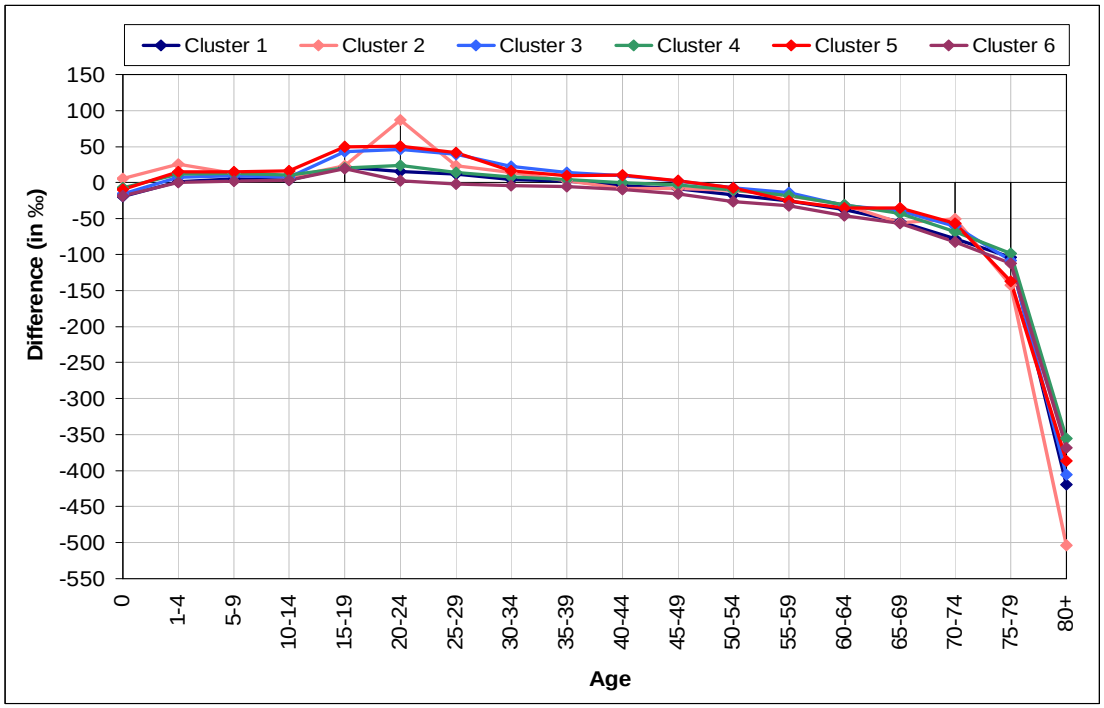
Source: Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

Fig. 3: The role of migration in development of population age structure by clusters of districts, East Kazakhstan region, males, 1999-2003



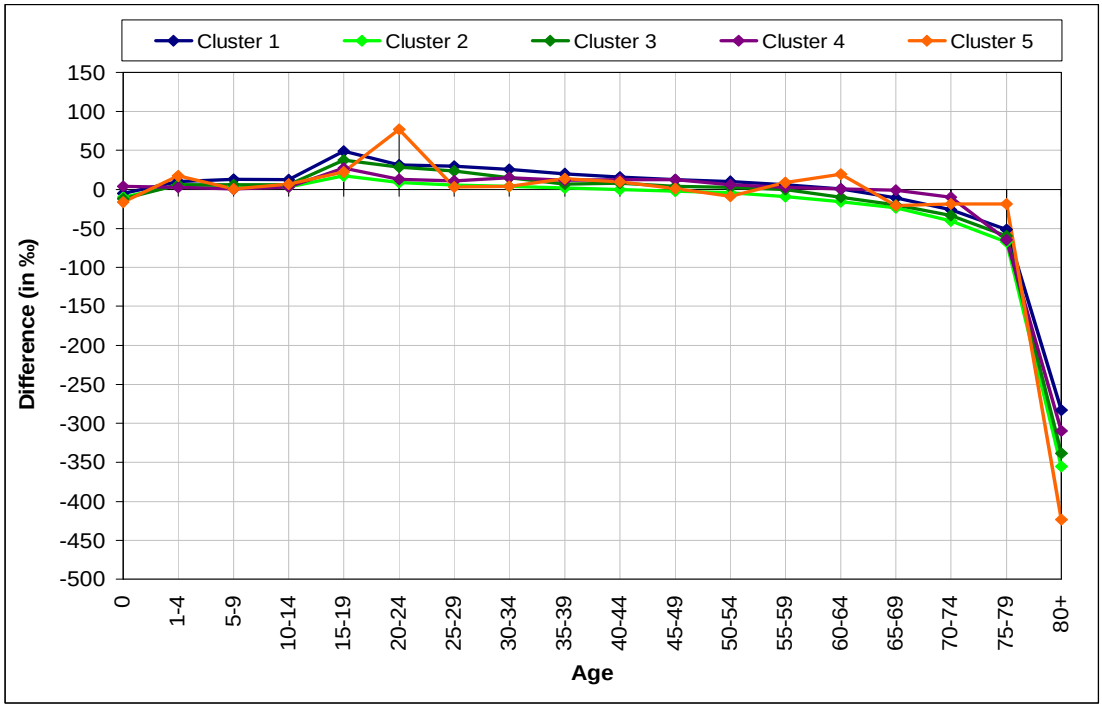
Source: Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

Fig. 4: The role of migration in development of population age structure by clusters of districts, East Kazakhstan region, males, 2004-2008



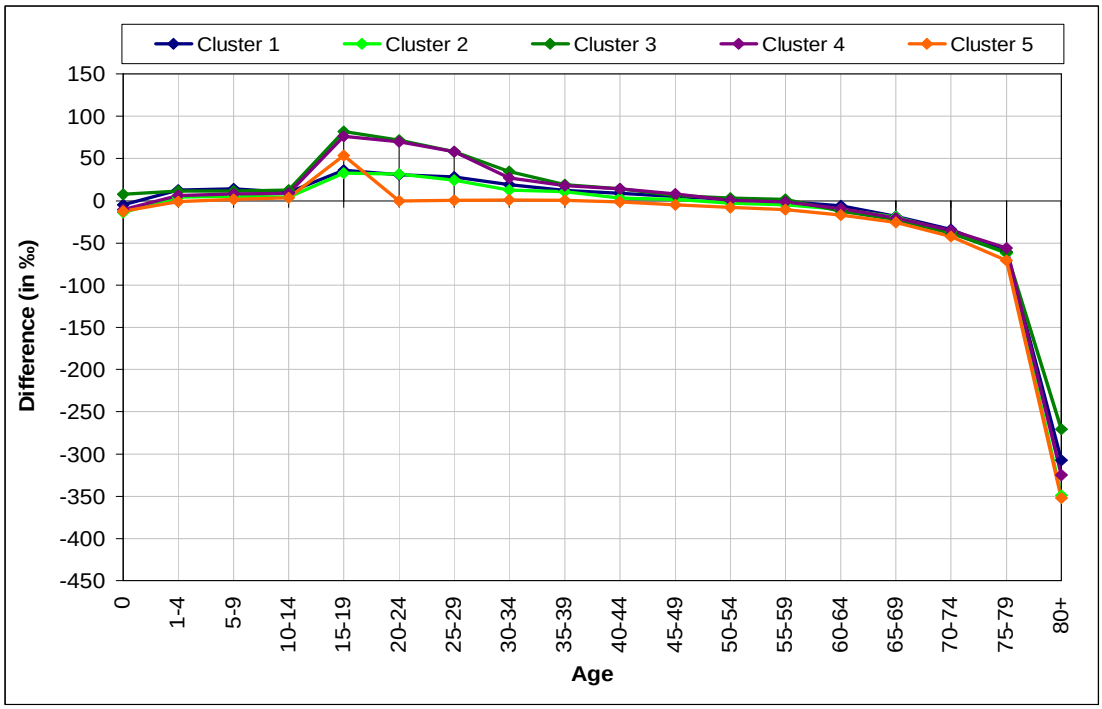
Source: Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

Fig. 5: The role of migration in development of population age structure by clusters of districts, East Kazakhstan region, females, 1999-2003



Source: Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

Fig. 6: The role of migration in development of population age structure by clusters of districts, East Kazakhstan region, females, 2004-2008



Source: Author's calculation based on data of the Agency on Statistics of the Republic of Kazakhstan

APPENDIX 5

Tab. 1: Generalization of the classification of districts by the role of migration in population size development, East Kazakhstan region, both sexes, 1999-2003

Cluster	Members of cluster	Features of cluster
1	Ust-Kamenogorsk and Kurchatov cities, Zaysansky, Shemonaikhinsky, Tarbagataysky, Urdzharsky, and Ulansky districts.	Industrial and agricultural districts, population decline, excluding Kurchatov city.
2	Zharminsky, Kurchumsky, Borodulikhinsky, Beskaragaysky, Katon-Karagaisky, and Kokpektinsky districts.	Agricultural districts. Excluding Borodulikhinsky district, with prevalence of Kazakhs in population ethnic composition, situated far from the administrative center. Migrant-donor districts.
3	Abaysky, Ayagozsky districts.	Agricultural districts with prevalence of Kazakhs in ethnic composition of the population, they are neighbor districts situated close to Semey city. Positive natural change, but population declined.
4	Glubokovsky, Zyryanovsky districts, and Ridder city.	Industrial districts with prevalence of European ethnic groups in ethnic composition of the population, they are neighbor districts situated in the north part of the region, have international border with Russian Federation. High level of negative natural change in comparison with other districts, the highest population decline. Migrant-donor districts, excluding Glubokovsky district, which is a migrant-recipient district.
5	Semey city.	Industrial district where population development was under impact of migration and natural change at the same level, prevalence of Kazakhs in ethnic composition of the population. Second big city in the region, center of inflow of migrants or migrant-recipient region.

Source: Adopted from figure 27

Tab. 2: Generalization of the classification of districts by the role of migration in population size development, East Kazakhstan region, both sexes, 2004-2008

Cluster	Members of cluster	Features of cluster
1	Kurchatov city, Zharminsky, Kurchumsky, Borodulikhinsky, Beskaragaysky, Kokpektinsky Katon-Karagaisky, districts.	Excluding Kurchatov city, population decline and migrant-donor districts, they are far from the administrative center.
2	Tarbagataysky, Urdzharsky, Ayagozsky, and Abaysky districts.	Districts located in the south part of the region and they are the districts where population net migration rate is the highest, they are neighbors.
3	Ust-Kamenogorsk city and Ulansky district.	They are neighborhood. The exchange of migrants between each other.
4	Zyryanovsky, Shemonaikhinsky, Glubokovsky, Zaysansky districts.	Industrial districts. Excluding Glubokovsky district population decline was intensified by negative natural change.
5	Ridder city.	Industrial district. The prevalence of European ethnic groups in ethnic composition of the population. One of the main industrial centers of the region. High level of negative natural change and net migration rates.

Source: Adopted from figure 28

Tab. 3: Generalization of the classification of districts by the role of migration in population age structure development, East Kazakhstan region, both sexes, 1999-2003

Cluster	Members of cluster	Features of cluster
1	Semey and Ridder cities, Zyryanovsky district.	Industrial areas with high level of mortality and migration, excluding Semey city, old population age structure and prevalence of European ethnic groups. Districts with prevalence of urban population. The influence of mortality on newborns and older people is higher than in other clusters. The impact of mortality from age group 30-34 years.
2	Ust-Kamenogorsk city, Zaysansky, Shemonaikhinsky, Ulansky, Beskaragaysky, and Glubokovsky districts.	Excluding Ulansky and Beskaragaysky districts, industrial districts with high level of mortality and migration, old age structure of population and prevalence of European ethnic groups. Districts with mixed urban and rural population. The impact of mortality from age group 45-49 years.
3	Kurchatov city.	Industrial district, high intensity of net migration rate, especially at young ages. Influence of migration in age groups 0-29, 40-49 and 60-64 years, age groups 30-39, 50-59, 65 years and over developed under the impact of mortality. Main base of oralmans.
4	Abaysky, Ayagozsky, Zharminsky, Katon-Karagaisky, Kokpektinsky, Kurchumsky, Tarbagataysky, Urdzharsky, and Borodulikhinsky districts.	Agricultural districts, influence of mortality begins from age group 55-59 years, impact of migration in age group 1-49 years is higher in comparison with other age groups, prevalence of Kazakhs, and age structure developed under the influence of migration mostly.

Source: Adopted from figure 33

Tab. 4: Generalization of the classification of districts by the role of migration in population age structure development, East Kazakhstan region, both sexes, 2004-2008

Cluster	Members of cluster	Features of cluster
1	Ust-Kamenogorsk, Semey, Kurchatov cities, Zyryanovsky, Zaysansky, Shemonaikhinsky, and Glubokovsky districts.	Industrial district with high level of mortality and migration. Old population age structure and prevalence of European ethnic groups, excluding Semey city and Zaysansky district. Districts with mixed urban and rural population. The impact of mortality from age group 45-49 years.
2	Ulansky district.	Agricultural district, situated much close to the administrative center, very high intensity of migration, impact on age structure begins from age group 30-34 years, and age structure is developed under the impact of mortality.
3	Ridder city.	Industrial district, high intensity of mortality rate in working age group (excess and premature males' mortality) and high level of negative natural change rate. Influence of mortality from age group 25-29 years. The prevalence of European ethnic groups in ethnic composition of the population.
4	Abaysky, Ayagozsky, Zharminsky, Kokpektinsky, Katon-Karagaisky, Kurchumsky, Tarbagataysky, Urdzharsky, Beskaragaysky and Borodulikhinsky districts.	Agricultural districts, influence of mortality begins from age group 55-59, impact of migration on age group 1-49 years is higher in comparison with other age groups, prevalence of Kazakhs, age structure is developed mostly under the influence of migration

Source: Adopted from figure 34

Tab. 5: Generalization of the classification of districts by the role of migration in population age structure development, East Kazakhstan region, males, 1999-2003

Cluster	Members of cluster	Features of cluster
1	Tarbagataysky, Urdzharsky, Abaysky, Kokpektinsky Zharminsky, Kurchumsky, Katon-Karagaisky, Borodulikhinsky, and Ayagozsky districts.	Influence of mortality begins from age group 50-54 years, impact of migration on age group 1-49 years is higher in comparison with other age groups, prevalence of Kazakhs, agricultural districts, age structure is developed mostly under the influence of migration
2	Glubokovsky, Beskaragaysky, Zaysansky, Ulansky, Shemonaikhinsky districts, and Ust-Kamenogorsk city.	Mixed with agricultural and industrial economic orientation districts, excluding Ulansky and Zaysansky districts, old population age structure, impact of mortality on the development of population age structure begins from age group 40-44 years, high intensity of males' mortality, excluding Ulansky, Beskaragaysky and Zaysansky districts, prevalence of European ethnic groups, developed under the impact of both of them
3	Semey and Ridder cities, Zyryanovsky district.	Industrial districts, excluding Semey city, prevalence of European ethnic groups, mortality impact on age structure begins from age group 25-29 years, age structure is mostly developed under the influence of mortality. The high level of males' mortality in young ages.
4	Kurchatov city.	Industrial district, high intensity of net migration rate, especially at young ages. Influence of migration in age group of newborns and from age group 45-49 years.

Source: Adopted from figure 35

Tab. 6: Generalization of the classification of districts by the role of migration in population age structure development, East Kazakhstan region, males, 2004-2008

Cluster	Members of cluster	Features of cluster
1	Semey city, Zyryanovsky, Zaysansky, Glubokovsky, Shemonaikhinsky districts.	Industrial district, high intensity of mortality rate in working age group, Influence of mortality from age group 30-34 years. Semey city is main base of oralmans, situated close to administrative center. Excluding Semey city, the prevalence of European ethnic groups in ethnic composition of the population.
2	Ridder city.	Industrial district, high intensity of mortality rate in working age group (excess and premature males' mortality) and high level of negative natural change rate. Influence of mortality from age group 40-44 years. The prevalence of European ethnic groups in ethnic composition of the population.
3	Ulansky district.	Agricultural district, very close to the administrative center, very high intensity of migration, impact on age structure begins form age group 50-44 years.
4	Beskaragaysky, Ayagozsky, Kokpektinsky, Katon-Karagaisky, Kurchumsky, Tarbagataysky, Urdzharsky, Zharminsky, Borodulikhinsky, and Abaysky districts.	Agricultural districts, population with prevalence of Kazakhs and rural population, impact on age structure begins from age group 45-49 years, situated far from the administrative center, young age structure.
5	Kurchatov city.	Industrial district, high intensity of net migration rate, especially at young ages. Influence of mortality in age group of newborns and from age group 45-49 years. Main base of oralmans.
6	Ust-Kamenogorsk city.	Administrative center, one of the main industrial districts, impact of mortality begins from age group 25-29 years, the concentration of European ethnic groups, old age structure of population, and bad ecological situation.

Source: Adopted from figure 36

Tab. 7: Generalization of the classification of districts by the role of migration in population age structure development, East Kazakhstan region, females, 1999-2003

Cluster	Members of cluster	Features of cluster
1	Zharminsky, Kokpektinsky, Kurchumsky Borodulikhinsky, Katon-Karagaisky, Tarbagataysky, Urdzharsky, Abaysky, and Ayagozsky districts.	Agricultural districts with young age structure of population, high level of natality and the highest females' net migration rate in comparison with other districts, mortality begins to play a key role in age structure development from age group 65-69 years. Prevalence of Kazakhs in ethnic composition of the population.
2	Semey, Ust-Kamenogorsk, Ridder cities, Zyryanovsky Glubokovsky districts.	Industrial districts with old age structure of population and prevalence of European ethnic groups in ethnic composition of the population, high level of negative net migration and natural change rates, excluding Semey city, age-specific mortality rate exceeds age-specific net migration rate from age group 45-49 years.
3	Beskaragaysky, Shemonaikhinsky, and Zaysansky districts.	Agricultural and industrial districts, mortality influence begins from age group 60-64 years.
4	Ulansky district.	Migration impact was observed in age group of newborns and mortality influence begins from age group 65-69 years.
5	Kurchatov city.	Industrial district, high intensity of net migration rate, especially at young ages. Influence of migration in age group of newborns and from age group 50-54 years, then in next two age groups impact of migration is observed and then again from age group 65-69 years there is an impact of mortality. Main base of oralmans.

Source: Adopted from figure 37

Tab. 8: Generalization of the classification of districts by the role of migration in population age structure development, East Kazakhstan region, females, 2004-2008

Cluster	Members of cluster	Features of cluster
1	Zharminsky, Kokpektinsky, Kurchumsky Borodulikhinsky, Katon-Karagaisky, Tarbagataysky, Beskaragaysky, Urdzharsky, Abaysky, and Ayagozsky districts.	Agricultural districts with young age structure of population, high level of natality and the highest females' net migration rate in comparison with other districts, mortality begins to play a key role from age group 55-59 years.
2	Semey, Ridder cities, Zyryanovsky, Zaysansky, Glubokovsky, and Shemonaikhinsky districts.	Industrial districts with old population age structure and prevalence of European ethnic groups in population ethnic composition, high level of negative net migration and natural change rates, excluding Semey city, age-specific mortality rate exceeds age-specific net migration rate from age group 50-54 years.
3	Kurchatov city.	Industrial district, high intensity of net migration rate, especially at young ages. Influence of mortality in age group of newborns and from age group 60-64 years. Main base of oralmans.
4	Ulansky district.	Migration impact was observed in age group of newborns and mortality influence begins from age group 55-59 years.
5	Ust-Kamenogorsk city.	Administrative center, one of the main industrial districts, impact of mortality begins from age group 40-44, high concentration of European ethnic groups, old age structure of the population and bad ecological situation.

Source: Adopted from figure 38